# Fertility and health insurance types in Germany

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# Fertility and health insurance types in Germany

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**Abstract**

In this paper I study how different health insurance types in Germany alter the incentives to give birth. A stylized model illustrates that both the private and statutory health insurance can imply a higher number of births. While the family insurance in the latter clearly reduces the costs per child, income effects due to varying parental premia might operate in the opposite direction. If they are higher in the statutory health insurance, for instance, due to a selection of healthy individuals in the private health insurance, the latter might induce a higher number of births. Relying on data of the German Socio Economic Panel, I apply endogenous treatment effects models for count data to control for selection effects. Estimation results indicate that the private health insurance positively affects the number of births. The positive impact is robust across several alternative specifications.

*Keywords:* Dual health insurance system; Fertility; Health insurance choice;

*JEL classification: I13; J13*

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# 1 Introduction

Social security systems exhibit an interesting two-way interaction with population dynamics. On the one hand, a low and shrinking number of births combined with increasing longevity challenges social security systems and endangers financial sustainability of the health system in particular (Hagist *et al.*, 2005). On the other hand, social security systems influence population dynamics.[1] The implementation of a health insurance system leads to better medical care for broad sections of the population. Consequently, mortality decreases, which in turn exacerbates the challenge of financial sustainability of the health insurance system. Simultaneously, health insurances alter incentives to give birth. First, they cover costs related to sickness of children and hence reduce costs of child rearing. Secondly, better health care decreases infant and child mortality which indirectly influences fertility.[2] The health insurance system has a positive impact on the number of births and moderates the fertility transition (Winegarden and Murray, 2004) – a pleasant side effect in light of the fertility below the replacement level observed in most developed economies since the 1970s (Frejka and Sobotka, 2008). Nevertheless, the organization of the health insurance system determines how incentives to give birth are affected. Higher incentives to give birth might support family policies and help to ensure financial sustainability of the health care system.

Nowadays, several countries like Chile, Germany or the Netherlands have implemented dual public (or statutory) and private health insurance systems to fund health expenditures. If the two insurance types are organized as mutually exclusive alternatives that alter incentives to give birth differently, they are particularly suitable to investigate the impact of health insurance on fertility.[3] In Germany, for instance, there are several aspects that vary between the private and statutory health insurance. In particular three

[1]This two-way interaction has been widely studied for pension systems, see Von Auer and Büttner (2004); Fenge and Meier (2005); Wigger (1999) among many others. Once they are introduced, retired individuals no longer depend on their children or other family members. A fiscal externality arises which reduces incentives to give birth and might lead to an insufficiently low fertility. Simultaneously, pension systems, especially if organized as pay-as-you-go schemes, rely on a sufficient fertility given that children are future contributors. Each child induces a positive externatlity as its contributions will relax the budget constraint of the pay-as-you-go pension (Von Auer and Büttner, 2004; Fenge and Meier, 2005; Van Groezen *et al.*, 2003). Hence, the challenging retirees-contributors-ratio due to the low number of births might be (at least partially) induced by the system itself.
Compared to the pension system, some fundamental differences arise in the health insurance system: While the pension system has a negative impact on fertility, Winegarden and Murray (2004) find that the implementation of early health insurances positively affected fertility. Furthermore, as soon as private and statutory health insurances exist as alternatives, as it is the case in Germany, individuals are able to choose (under certain circumstances in Germany). This might lead to a selection. Healthy individuals with high income and a low number of dependents will choose the PHI (Greß, 2007). Finally, the health system involves all generations – children, the working generation and retirees.

[2]The relation between infant and child mortality and fertility is well documented in the literature, see e.g. Galloway *et al.* (1998).

[3]The private health insurance might either serve as alternative, supplementary or/and complementary insurance (OECD, 2011). Colombo and Tapay (2004) offer an overview on the different types of private coverage across countries.

of them might affect the number of births differently: First of all, varying costs for children are the most obvious difference that influences incentives to give birth. While the statutory health insurance does not charge fees for children, they are subject to contributions in the private health insurance. The price of a full coverage insurance for a child younger than age 16, for instance, was at least 80 € in 2014. Secondly, parents' premia to the health insurance differ. Statutory insured adults either contribute a fixed share of their labor income or a lump-sum transfer if their labor income is sufficiently high. By contrast, the premium in the private health insurance depends on individual risks. A high share of couples privately insured in 2010, for instance, paid lower contributions for the whole family than they would have contributed to statutory health insurance.[4] Thirdly, a better health status often characterizes privately insured individuals, caused by self-selection as well as better medical care in the private health insurance (Greß, 2007). Both the varying contributions and benefits alter parental income and hence incentives to give birth.

Another important difference between private and statutory health insurance, related to the two-way interaction of population dynamics and health insurance systems, is the robustness of contributions with respect to population dynamics. The statutory health insurance follows a pay-as-you-go like scheme, includes strong inter-generational transfers and might even represent the highest risk on fiscal sustainability (Hagist *et al.*, 2005). An increasing share of old individuals might raise contributions of the working generation and their financial burden. By contrast, the private health insurance is fully-funded. To avoid soaring premia, due to health expenditures that increase with age, members make old-age provisions.

In this paper, I study how the different health insurance types alter incentives to give birth in the German dual health insurance system. Thereby, I exclusively focus on the effects of private and statutory health insurances on the number of births and neglect non-insured individuals. The share of women not covered by one of the two health insurance types is too low to compare them with insured ones.[5] To illustrate the way Germany's statutory and private health insurances might affect fertility, I present a stylized model. Relying on the literature on the demand for children, parents choose the number of children and the type of health insurance.[6] As both are mainly family decisions, I assume Unitarian households. Additionally, I neglect the impact of family policies to focus on the way the type of health insurance alters the household's number of births.[7] Children in the private health insurance are more expensive than in

[4]Own calculations from GSOEP, see Section 4.2.

[5]Since 2009 a membership either in the private or statutory health insurance is compulsory in Germany (§ 198 III VVG)).

[6]The literature on endogenous fertility usually explains the number of births by the demand for children. They enter parents' preferences and entail costs. By contrast, the supply of children has a more biological perspective. Parents have means at their disposal, like contraceptive methods, to influence the number of births given by an exogenous supply function (Rosenzweig and Schultz, 1985).

[7]In Germany a variety of family policies exists, like the child benefit between 190 € and 221 € in 2016 (§ 66 (1) Income Tax Act and § 6(1) Federal Law on family allowances) or the federal child support for needy families (§ 6a Federal Law on family allowances). While the former concerns all families,

the statutory health insurance. In the family insurance of the latter they are free of charge, whereas privately insured parents have to pay a premium per child. The higher price reduces fertility.[8] Nevertheless, parents income net of contributions to the health insurance might be higher in the private than in the statutory health insurance which is a situation that is more likely, if adverse age structures increase contributions to the statutory health insurance[9] and good individual health risks lead to low premia in the private health insurance. Additionally, the latter might have a positive impact on individual health status[10] which might increase potential income.[11] Hence, the varying costs of children and income net of contributions to the statutory or private health insurance present mechanisms that potentially induce differential fertility in the two health insurance types. Nevertheless, they might operate in opposite directions: The higher price of privately insured children reduces the number of births, while lower parental premia combined with a better health status in the private health insurance might increase parents' income net of contributions to the health insurance and, hence, raise the number of births.[12] The latter is more likely to dominate if parental labor income is sufficiently high and premia to the private health insurance low. Simultaneously, parents are more likely to prefer to be privately health insured in this case.

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the latter only matters for the very poor. Furthermore, the very poor additionally get basic security benefits independent of the number of children (Twelfth Book Code of Social Law). Nevertheless, even if basic security benefits and child support for needy families introduces some non-linearity, they do not alter the main theoretical findings.

[8]Similar mechanisms exist in the literature on public and private education, see e.g. de la Croix and Doepke (2004). However, the decision on the health insurance type holds for parents and their children, whereas the decision on education is done exclusively for the children.

[9]If the share of old individuals is high, contributions of an average family exceed the benefits. The statutory health insurance organized in the pay-as-you-go scheme becomes unfavorable for families, as they co-finance health expenditures of old individuals (Niehaus, 2009).

[10]The positive impact on the health status might be induced by either more intense or better medical treatments or higher incentives to invest in prevention (Hullegie and Klein, 2010).

[11]As fiscal externalities in Germany's pay-as-you-go statutory health insurance scheme are similar to the pay-as-you-go pension scheme and the latter are already widely discussed in the literature, I focus on the way the different types of health insurance account for children and its impact on the incentives to give birth. A limited number of OLG-models highlight the interaction of health expenditures and fertility in a general equilibrium framework. Varvarigos and Zakaria (2013) show that private health expenditures, which are complementary to public ones, are able to explain shrinking fertility, even if children are not directly linked to health costs. They exclusively focus on health expenditures paid by the elderly.

[12]The impact of income on fertility has been widely studied in the literature. The well documented negative relationship across time and countries on the macro-level, for a discussion see for example Jones *et al.* (2010), seems to have recently turned into a positive one for high developed economies (Fox *et al.*, 2015). On the micro-level, Freedman (1963) estimates a positive impact of husbands' relative and a negative effect of his absolute income on fertility, while Freedman and Thornton (1982) find some evidence that husband's income is positively related to the number of births. In a more recent study, Lindo (2010) also estimates a positive link between income and completed fertility by using job displacement induced income shocks. The majority (and all significant) estimated coefficient measuring the impact of the lagged gross labor income on fertility are also positive in the present study.

The impact of the statutory and private health insurance on the costs of children and on the potential net income can affect fertility in opposite directions. To examine whether the private health insurance goes along with a higher or lower number of births in Germany, I rely on data from the German Socio Economic Panel (GSEOP). Focusing on total fertility rates, I do not find significant differences between private and statutory health insurance if I split the sample by type of health insurance. However, age-specific fertility rates indicate that births are postponed and more concentrated in some age groups in the private health insurance. Furthermore, estimations with endogenous treatment effects models for count data evidence that fertility of privately insured women is higher. The number of births in the private health insurance is around 1.24 times higher than in the statutory health insurance. This factor increases to 1.29 when the characteristics of the partner are controlled for. In the counterfactual scenario in which all women are privately insured, average overall fertility would increase by around 23.9% or 8.3 children per 1000 women in fertile age (average treatment effect). In the sub-sample that enables to control for characteristics of the spouse, the average effect on fertility increases to 28.1% or 11.1 births per 1000 women. The impact is somewhat lower among privately insured female members. The estimated average treatment effects on the treated range between 19.7% or 8.1 births per 1000 person-years in the baseline model and 22.5% or 11.1 births per 1000 person-years if partners' characteristics are controlled for. The positive impact of the private health insurance is quite robust across several alternative specifications, including random-effects models for count data. As illustrated in the stylized model, lower parental contributions that dominate the additional costs of children are one possible explanation for the higher fertility in the private health insurance. Better medical treatments, going along with better health, can additionally reinforce the higher net income in the private health insurance and, hence, increase incentives to give birth.

The remainder of the paper is organized as follows. Section 2 briefly presents the dual German health insurance system. A stylized theoretical model illustrates the main mechanisms explaining differential fertility in Section 3. Section 4 empirically investigates the link between the type of health insurance and fertility. Section 5 tests the robustness of the estimation results by several alternative specifications. Finally, Section 6 concludes.

# 2 Statutory and private health insurance in Germany

## 2.1 Fundamental differences in the statutory and private health insurance

A dual system of health insurances characterizes Germany's health care system. In principal, an obligation to take out a health insurance for all employees exists in Germany

(§ 5(1) SGB V[13]). However, certain conditions enable an exemption from statutory health insurance (SHI). Employees with a regular wage that exceeds the *social security ceiling* (SSC) as well as some particular professional groups like civil servants, judges, servicemen or fixed term military personnel are exempt from the obligatory insurance (§ 6(1) SGB V). In contrast to mandatory members of statutory health insurance, they can choose between a voluntary membership in the statutory and the private health insurance (PHI). Nevertheless, individuals who opt for the private health insurance should consider that switching back to statutory health insurance is limited by certain rules.[14]

Table 1: DIFFERENCES BETWEEN STATUTORY AND PRIVATE HEALTH INSURANCE

| **Health insurance** | **Statutory health insurance** | **Private health insurance** |
|---|---|---|
| Aims at | Solidarity | Fairness of benefits |
| Organized as | Pay-as-you-go system | Fully funded system |
| Balanced budget | Each period across participants | Of members over life-cycle |
| Premium depends on | (Labor) income | Individual characteristics (risk) |
| Children | Free as family members | Parents contribute |

In Germany, the design of the two health insurance types generally differs. Table 1 summarizes the most important differences and Figure 1 illustrates possible insurance status of individuals. The statutory health insurance aims at solidarity (§ 3 SGB V) and is organized in a pay-as-you-go scheme. In each period contributions have to balance expenditures across all members. The former depend on (labor) income until it meets the *(social security) contribution assessment ceiling* (SSCAC). Currently, gross income is taxed by 14.6% equally distributed between employee and employer.[15] As soon as income exceeds the *social security contribution assessment ceiling*, contributions to the SHI are independent of labor income. The SSCAC times the contribution rate fixes the

[13]Fifth Book Code of Social Law.

[14]Employees, for instance, would have to reduce their income below the SSC to switch back to SHI. Self-employed individuals have to start a main professional activity as employee and continue their business as a side job. Alternatively, they can terminate their business such that the spouse can cover them in the family insurance if their income is below 415 € in 2016 (or 450 € for Mini-jobs). To switch back to the SHI is even more difficult for privately insured individuals older than 55 years. For these individuals the family insurance is one option in case of an income below 415 € in 2016 (or 450 € for Mini-jobs) and if their spouse is in the statutory health insurance (§ 10 SGB V).

[15]Until 31.12.2014 members in the SHI additionally paid a *special contribution* of 0.9%. To increase competition between statutory health insurance, providers can charge members with an income dependent additional contribution since 2015. In addition, 2.35% of gross labor income are contributed to statutory nursing care insurance. Contributions are once again limited by SSCAC and equally distributed between employee and employer. Additionally, childless individuals who have completed their 23rd year of life have to contribute 0.25%-points of their labor income which is subject to the social insurance contributions (§ 55 SGB XI).

upper limit of monthly contributions which stood at 618.68[16] € per month in 2016.[17] Benefits are defined according to the *catalogue of benefits* (Chapter 3 SGB V). Taking out additional insurances increases flexibility and coverage.

By contrast, the private health insurance, follows the principle of equivalence and is organized in a fully-funded scheme. Contributions and expenditures of a member balance over the life-cycle. Individual risks, in particular determined by age and health status, as well as insured benefits determine the premium.[18] Flexibility in fixing benefits allows to adjust individual coverage to the needs of members and often a higher coverage. A better performance combined with lower contributions in particular for healthy and young individuals make a membership in the PHI more attractive.

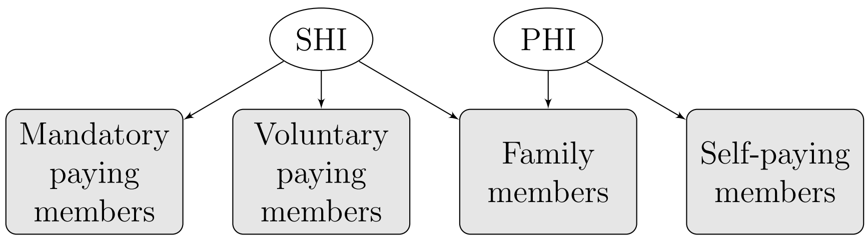



Figure 1: Status of individuals in Germany's health insurances

## 2.2 Differences concerning giving birth and children

Pregnancies and births are costly and handled differently in both types of health insurances. The catalogue of benefits defines the required examinations and treatments funded by the SHI during pregnancy. By contrast, those reimbursed by the PHI depend on individually fixed contracts. In vitro fertilization is only one example where coverage in statutory and private health insurance differs. A share of the costs is covered by the statutory health insurance up to three times (§ 27a SGB V). How much costs are covered by the PHI depends on the tariff plan. As a much higher share of costs is potentially covered, a private insurance might be interesting for couples with trouble to conceive. Another subject related to give birth are contributions to the insurance of mothers (and fathers) during the period they receive maternity, parental as well

[16]The value does not include the supplemental premium charged by most insurance providers. Additionally, the maximum contribution to the statutory nursing care insurance is 110.18 € per month (99.58 € per month with children).

[17]Since 1999 the SSCAC increased from around 3259 to 4237.5 € per month in 2016. While SSCAC and SSC coincided until the end of 2001, SSC is higher since then (4687.5 € per month in 2016).

[18]Several private health insurance companies facilitate a private insure for civil servants according to the "Opening clause". If new civil servants apply for the first time and respect certain deadlines, no applicant is rejected due to health risks. Moreover, there is no exclusion of benefits and add-ons for health risks are limited to a maximum of 30% (Verband der Privaten Krankenversicherung e.V., 2014).

as child-raising allowances. According to § 224(1) SGB V statutory health insurance members are exempt from contributions. By contrast, members of PHI generally have to pay during these periods. However, some tariff plans offer reductions or discharge members.

The insurance of family members and therefore of children is organized differently in the statutory and private health insurance. If both parents are mandatory members in the former, children are generally covered until their $18^{th}$ birthday as members of the family and therefore parents do not need to pay a contribution for them (§ 10(2) SGB V).[19]

If parents are privately insured, children are either a voluntary member in the SHI (once again under certain conditions) or in the PHI (§ 9(1)1,2 SGB V). In both cases children are subject to fees. The minimum premium of 141.38 € in 2016 defines the contribution of children as voluntary members in the statutory health insurance.[20] If the membership of parents in the PHI lasts for at least three months and those of their newborn starts during the first two months after birth, its premium depends on the defined insurance coverage. Otherwise, the individual risk of the child is taken into account (§ 198 VVG[21]). Focusing on the most important insurance companies figures out that a full coverage insurance goes along with contributions from at least 80 € per month for children below age 16 in 2014. The *basis tariff* defines a kind of upper limit with 249 € p.m. for children and 251 € p.m. for young persons (16–20) in 2014. In general, contributions for children and young persons are below those of adults as they do not have to establish old age provisions (§ 12(1a)1 VAG[22]). In addition, several policies allow to decrease contributions, like the reimbursement of premia (if insurances had no expenses) or retention. Furthermore, civil servants receive aids up to 80% of the premium as specified in the *federal aid regulation* (§§ 2, 46 BBhV).

Beside the additional costs, benefits for children differ between private and statutory health insurances. Continued numeration in case the child is sick or coverage of mother-father-child health resorts are only two examples. While the latter is covered for statutory members if they appear medically necessary (§ 41 SGB V), this is often not the case in standard tariff plans of privately insured families. An additional insurance would be required. Generally, employees have an entitlement to continued remuneration in case of child's sickness according to § 616 BGB[23]. If the paragraph does not apply, members

[19]If children are non-working, they are covered until they reach age 23 and even age 25 if they are still educating (§ 10(2) SGB V). Children from a couple with one spouse in the statutory and private health insurance, respectively, are an exception. If the member of the latter has a higher income than the partner in the SHI, which in addition exceeds the SSCAC, children are subject to contributions. However, under certain conditions, the SHI covers the spouse as member of the family, too.

[20]The contribution rate of 14.6% times the fictive minimum income of 968.33 € per month determines the minimum premium (§ 240 SGB V). It increases by 22.76 € per month for the statutory nursing care insurance (2.35% of 968.33 €) and possibly by the insurance provider specific supplemental premium.

[21]Insurance Contract Act

[22]Insurance Supervision Law

[23]German Civil Code

of the SHI receive sick benefit up to 10 days per child[24] and up to 25 days in total (§ 45 SGB V). By contrast, there is usually no sickness benefit for parents in the private health insurance if the child is sick.[25]

Thus, simplifying the variety of laws and tariffs leads to the following conclusion: children induce different costs in both health insurance types. Parents have to contribute for each child in the PHI, whereas they are free of charge in the statutory health insurance. Furthermore, pregnancy and postnatal period are often more expensive in the private system. By contrast, depending on individual risks, parents' premium in the PHI might be below the contributions to the SHI and hence labor income net of contributions higher. As both aspects affect fertility in opposite directions, I apply a theoretical model to discuss conditions that lead to either a higher or lower fertility among privately insured women.

# 3 The model

This section aims at developing a model to illustrate specific mechanisms, according to which health insurance types in a dual health insurance system – as it is the case in Germany – affect the number of births.[26] This system is composed of a private health insurance, denoted by PHI, and a statutory health insurance. The latter distinguishes between members with income below and above the *social security contribution assessment ceiling* (SSCAC), denoted by $\mathrm{SHI}_1$ and $\mathrm{SHI}_2$, respectively. Working-age individuals $i$ (the parents), who are a member of health insurance type $j$, are selfish and value their own consumption $c_{i,j}$ and the number of children $n_{i,j}$. They insure the whole family either in the private or statutory health insurance. If instantaneous utilities are logarithmic, their utility is given by:

$$U_{i,j} = U\left(c_{i,j}, n_{i,j} \middle| \, j\right) = (1-\gamma)\ln c_{i,j} + \gamma \ln n_{i,j}, \tag{1}$$

with parameter $\gamma \in \, ]0,1[$ denoting the preference for children. All parents are endowed with one unit of time allocated on labor and child rearing. To bring up a child requires a share $\tau \in \, ]0,1[$ of the available time and is costly in terms of goods $a > \bar{a}_i > 0$. Beside goods cost for child rearing, individuals use their labor and exogenous non-labor income $b_i \geq 0$ net of contributions to the health insurance for consumption. Individuals' potential labor income $\omega_{i,j}$ is a function of the wage rate $w_i > 0$ and individual's health status $\mathbf{h}_i$. The latter is $H_i \in \mathbb{R}^+$ in the private and $h_i \in \mathbb{R}^+$ in the statutory health insurance:

[24] Single parents are entitled to 20 days of sickness benefit per child (§ 45(2) SGB V).

[25] Civil servants in the private health insurance can stay home with ill children by continued remuneration (§ 20(2) no. 3, 4 SUrlV (special holiday regulation)). The number of days and exact rules depend on salaries and the state for civil servants of states or if the individual is a federal civil servant.

[26] I desist from fully taking into account the two-way interaction between population dynamics and health insurance systems. In fact, I restrict to investigate the impact of health insurances on population dynamics, more precisely on fertility.

$$\mathbf{h}_{i,j} = \begin{cases} h_i & \text{if} \;\; j = \text{SHI}_1, \text{SHI}_2 \\ H_i & \text{if} \;\; j = \text{PHI}. \end{cases} \tag{2}$$

To capture potentially better medical care in the private health insurance, I assume $h_i \leq H_i$. In the statutory health insurance, a threshold $\bar{\omega} > \max\{y - b_i, 0\}$ reflects the SSCAC.[27] If parent's labor income is below this threshold $(1 - \tau n_{i,j})\, \omega_{i,j} \leq \bar{\omega}$, $j = \text{SHI}_1$ and they contribute a share $z \in \,]0, 1[$ of their labor income. Otherwise, if parents earn more than the SSCAC, they have to pay a fixed premium $y \equiv z\bar{\omega}$ to the statutory health insurance ($j = \text{SHI}_2$). In both cases, the premium is independent from individual health risks. Furthermore, the SHI is organized as family insurance and generally desists from charging fees for children. While I consider $z$ and $y$ as exogenous, they would be endogenous in a general equilibrium framework.[28] Privately insured adults have to pay the premium $x_i > 0$ which depends on their individual health risks. Higher health risks lead to higher premia. A membership in the private health insurance requires a sufficient total income. The latter has to be larger than parents' premium to the PHI: $\omega_{i,\text{PHI}} + b_i > x_i$. Additionally, parents have to contribute a fixed amount $x^k > 0$ per child.[29] Hence, depending on the type of health insurance, parents face the following budget constraint:

$$c_{i,j} = \begin{cases} (1 - \tau n_{i,j})\,(1 - z)\, \omega_{i,j} - a n_{i,j} + b_i & \text{if} \;\; j = \text{SHI}_1 \\ (1 - \tau n_{i,j})\, \omega_{i,j} - a n_{i,j} - y + b_i & \text{if} \;\; j = \text{SHI}_2 \\ (1 - \tau n_{i,j})\, \omega_{i,j} - \left(a + x^k\right) n_{i,j} - x_i + b_i & \text{if} \;\; j = \text{PHI}. \end{cases} \tag{3}$$

If individuals can choose the type of health insurance, they solve their maximization problem backwards. First, they determine the optimal choice on consumption and the number of births in each type of health insurance. Then, they compare indirect utilities between the SHI (depending on their labor income $\text{SHI}_1$ or $\text{SHI}_2$) and the PHI. They choose the health insurance type associated with the higher utility. By contrast, if individuals are obliged to stay in the SHI (or in the PHI), they directly maximize utility by choosing the number of children and consumption, given the type of health insurance. Table 2 presents optimal decisions on consumption and fertility according to labor income and type of health insurance.

[27] $\bar{\omega} > y - b_i$ ensures a non-negative total income net of contributions to the health insurance.

[28] A general equilibrium framework would allow to discuss effects of fertility on $z$ and $y$. In the family insurance, each newborn changes the insurance's age structure. Since contributions and required benefits vary across ages, the age structure is an important determinant of $z$ and $y$ in the SHI, organized in a pay-as-you-go scheme. In the short-run, children increase expenditures of the insurance and hence marginally raise parents' premium. In the long-run, children are potential contributors. Nevertheless, parents do not take into account these general equilibrium effects.

[29] Alternatively, it would be possible either to relate the premium of children to the risk of their parents or to their own risk.

Table 2: Individual decisions on $c_{i,j}$ and $n_{i,j}$ by health insurance type

| | $\text{SHI}_1$ | $\text{SHI}_2$ | PHI |
|---|---|---|---|
| Consumption ($c_{i,j}$) | $(1-\gamma)\left[(1-z)\,\omega_{i,j}+b_i\right]$ | $(1-\gamma)\left[\omega_{i,j}-y+b_i\right]$ | $(1-\gamma)\left[\omega_{i,j}-x_i+b_i\right]$ |
| Fertility ($n_{i,j}$) | $\frac{\gamma[(1-z)\omega_{i,j}+b_i]}{\tau(1-z)\omega_{i,j}+a}$ | $\frac{\gamma[\omega_{i,j}-y+b_i]}{\tau\omega_{i,j}+a}$ | $\frac{\gamma[\omega_{i,j}-x_i+b_i]}{\tau\omega_{i,j}+x^k+a}$ |

Parents consume the share $1-\gamma$ of their total net income, which is the sum of non-labor and potential labor income net of their contributions to assure themselves in the PHI or the whole family in the SHI. As detectable in the numerators of the decisions on $n_{i,j}$ in Table 2, the total net income also determines the individual number of offspring.[30] It is weighted by the preference for children $\gamma$ over the total costs per child in the denominators. If children are covered by the family insurance, only the goods $a$ and time costs occur. The latter are simply $\tau\omega_{i,j}$ if parents are privately insured or earn more than the SSCAC. If their labor income is below $\bar{\omega}$, the tax reduces the opportunity costs by $z\tau\omega_{i,j}$ and hence costs of child rearing. Privately insured parents additionally have to insure each child and contribute $x^k$ to the PHI. Note, that the higher potential labor income in the PHI, due to the better health, additionally increases the opportunity costs. Still, even if a child is more expensive in the PHI, parents might have more children, as the income net of their contributions to the health insurance might be higher.

Proposition 1 summarizes conditions under which the number of births in the private health insurance exceeds those in the statutory health insurance and makes use of the following income thresholds: $\hat{w}_i$ denotes the wage rate above which parents with a labor income below $\bar{\omega}$ give birth to fewer children in the statutory than in the private health insurance in case of zero non-labor income. I define this threshold as:

$$\hat{w}_i \equiv \frac{x_i a}{H_i a-(1-z)\,h_i\left(\tau x_i+x^k+a\right)}. \tag{4}$$

Symmetrically, the wage rate above which parents in the PHI have a higher number of births in absence of exogenous non-labor income than in the SHI for labor incomes above $\bar{\omega}$ is denoted by $\tilde{w}$, i.e.

$$\tilde{w}_i \equiv \frac{a\left(x_i^k-y\right)-yx^k}{H_i\left(\tau y+a\right)-h_i\left(\tau x_i+x^k+a\right)}, \tag{5}$$

with $a>\bar{a}_i\equiv\max\{\frac{(1-z)h_i\left(\tau x_i+x^k\right)}{H_i-(1-z)h_i},\frac{h_i\left(\tau x_i+x^k\right)-H_i y\tau}{H_i-h_i}\}$. Furthermore, critical values on non-labor income, denoted by $\hat{b}^*$ and $\tilde{b}^*$, exist below which the number of births in the

[30]Note that the impact of wages on fertility is either positive or negative. $a \lesseqgtr \tau b_i$ determines if the number of births decreases or increases with wages if women are for example in the $\text{SHI}_1$.

private is higher than in the statutory health insurance for labor incomes below and above $\bar{\omega}$, respectively. These thresholds are defined as following:

$$\hat{b}_i^* \equiv \frac{H_i w_i a - w_i h_i (1-z)\left(a + x^k + \tau x_i\right) - a x_i}{\tau w_i \left(H_i - (1-z) h_i\right) + x^k} \tag{6}$$

$$\tilde{b}_i^* \equiv \frac{H_i w_i (a + y\tau) - x_i (\tau h_i w_i + a) - (w_i h_i - y)\left(a + x^k\right)}{\tau w_i (H_i - h_i) + x^k}. \tag{7}$$

Hereafter, I use the following more general notation:

$$b_i^* = \begin{cases} \hat{b}_i^* & \text{if} \quad (1 - \tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{b}_i^* & \text{if} \quad (1 - \tau n_{i,j})\,\omega_{i,j} > \bar{\omega} \end{cases} \text{ and } w_i^* = \begin{cases} \hat{w}_i^* & \text{if} \quad (1 - \tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{w}_i^* & \text{if} \quad (1 - \tau n_{i,j})\,\omega_{i,j} > \bar{\omega}. \end{cases} \tag{8}$$

**Proposition 1** ***Number of births in case of no health insurance choice***
*There is a threshold $w_i^*$ on parents' wage rate, such that:*

1. *If $w_i < w_i^*$, the number of births in the PHI is lower than in the SHI for all $b_i \geq 0$.*
2. *If $w_i = w_i^*$, a zero non-labor income implies the same number of births in both health insurance types. If $b_i > 0$, the number of births is higher in the SHI than in the PHI.*
3. *If $w_i > w_i^*$, there exists a threshold $b_i^* > 0$ s.t. $0 \leq b_i < b_i^*$ goes along with a higher number of births in the PHI than in the SHI and a lower number of births if $b_i > b_i^*$. The number of births is the same in the PHI and SHI iff $b_i = b_i^*$.*

**Proof.** See Appendix B. ■

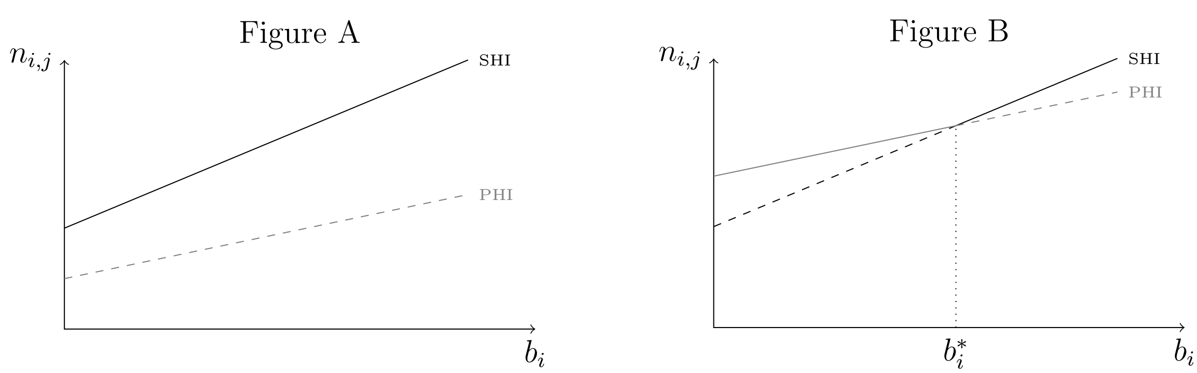



Figure 2: IMPACT OF NON-LABOR INCOME ON THE NUMBER OF BIRTHS

Figure A presents the number of births conditional on $b_i$ if $w_i < w_i^*$ and Figure B in the case of $w_i > w_i^*$. The black color marks the SHI and gray the PHI. Solid lines indicate a higher and dashed lines a lower number of births.

The potential income situation of parents, depending on the wage rate, health status, and exogenous non-labor income, related to children's costs determines whether the number of births is higher in statutory or private health insurance. Figure 2 illustrates this finding. The number of births is plotted as a function of the exogenous non-labor income of parents who are either a member in the statutory or the private health insurance.[31] The number of births in the SHI has a higher slope in $b_i$ as a child is less expensive. If $w_i \leq w_i^*$, then $b_i^*$ would be negative and already the absence of any non-labor income would exceed this critical value. Figure 2A illustrates that no point of intersection exists and less children are born in the PHI for all $b_i \geq 0$. By contrast, if $w_i > w_i^*$ a unique positive point of intersection exists. Low non-labor incomes, $b_i < b_i^*$, imply a higher number of births in the PHI. Once $b_i$ exceeds the threshold, members of the SHI bear more children, see Figure 2B.[32]

Having calculated the optimal individual behavior for both types of health insurances enables parents to decide if they prefer to stay in the SHI or switch to the PHI. To compare indirect utilities in Lemma 1, I rely on the following thresholds: The non-labor income above which parents with labor income $(1-\tau n_{i,j})\,\omega_{i,j} < \bar{\omega}$ prefer the statutory health insurance is denoted by $\hat{b}_i^{**}$ and is defined as:

$$\hat{b}_i^{**} \equiv \frac{1}{1-\rho_i}\left[w_i\left(\rho_i H_i - (1-z)\,h_i\right) - x_i\rho_i\right], \tag{9}$$

with $\rho_i \equiv \left[\frac{\tau h_i(1-z)w_i+a}{\tau H_i w_i + a + x^k}\right]^{\gamma}$. Furthermore, there exists an individual working-age premium to the PHI $\hat{x}_i$ that leads to $\hat{b}_i^{**} = 0$ for a given $w_i$:

$$\hat{x}_i \equiv \frac{1}{\rho_i} w_i\left(\rho_i H_i - (1-z)\,h_i\right).$$

Likewise, all parents characterized by $(1-\tau n_{i,j})\,\omega_{i,j} \geq \bar{\omega}$ are indifferent between the SHI and the PHI for the exogenous non-labor income $\tilde{b}_i^{**}$, defined as:

$$\tilde{b}_i^{**} \equiv \frac{1}{1-\lambda_i}\left[(\lambda_i H_i - h_i)\,w_i - \lambda_i x_i + y\right], \tag{10}$$

[31] Figure 2 looks exactly the same if parents contribute to SHI via taxes on labor income ($SHI_1$) or lump-sum transfers ($SHI_2$). Only the thresholds change from $\hat{w}_i$ to $\tilde{w}_i$ and from $\hat{b}_i^*$ to $\tilde{b}_i^*$ according to Eq. (8).

[32] For simplicity, I disregard the impact of family policies on the number of births. In Germany, all households get an allowance independently of their income which reduces good costs of children, captured by a lower $a$. Very poor families may get an additional allowance independent of the number of children. It would introduce an initial value for the sum of non-labor and labor income $(\omega_{i,j}+b_i)_0$ such that $\forall\,(\omega_{i,j}+b_i) < (\omega_{i,j}+b_i)_0$ the good costs $a$ would be reduced again. Taking this into account would not invalidate my main result that the number of births in the private may be higher than in the statutory health insurance. This is intuitively proved by thinking of a situation where $(\omega_{i,j}+b_i)_0 \to 0^+$ and hence $(\omega_{i,j}+b_i)_0 < x_i$. A membership in the PHI is excluded for such low incomes and once $\omega_{i,j}+b_i \geq (\omega_{i,j}+b_i)_0$, the results presented above apply.

with $\lambda_i \equiv \left[\frac{\tau h_i w_i + a}{\tau H_i w_i + a + x^k}\right]^\gamma$ and a threshold $\tilde{x}_i$ that ensures $\tilde{b}_i^{**} = 0$:

$$\tilde{x}_i \equiv \frac{1}{\lambda_i}\left(w_i\left(H_i\lambda_i - h_i\right) + y\right).$$

In the comparison of statutory and private health insurance, I use the following notation hereafter:

$$b_i^{**} = \begin{cases} \hat{b}_i^{**} & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{b}_i^{**} & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega} \end{cases} \quad \text{and} \quad x_i^* = \begin{cases} \hat{x}_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{x}_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega}. \end{cases} \tag{11}$$

**Lemma 1** ***Health insurence choice***

*There exists a critical contribution to the PHI $x_i^* > 0$ such that:*

1. *If $x_i > x_i^*$, individuals prefer the SHI for all $b_i \geq 0$.*
2. *If $x_i = x_i^*$, individuals are indifferent between the SHI and the PHI iff $b_i^{**} = b_i = 0$. For all $b_i > 0$ individuals prefer the SHI.*
3. *If $x_i < x_i^*$, there exists a value $b_i^{**} > 0$, s.t. if $0 \leq b_i < \hat{b}_i^{**}$, individuals prefer the PHI. By contrast, individuals are indifferent between PHI and SHI iff $b_i^{**} = b_i$. The latter is preferred for all $b_i > b_i^{**}$.*

**Proof.** See Appendix B. ■

Lemma 1 illustrates that even in this stylized model several aspects determine which health insurance type parents prefer. A sufficiently low contribution to the PHI, combined with a strong positive impact on the labor income as well as a high wage rate itself make the PHI more favorable. By contrast, an increasing relation of costs per child in the PHI compared to the SHI reduces the incentives to insure privately. Thereby, the preference for children $\gamma$ determines how much the ratio of costs per child is included in the choice of a health insurance type. Comparing the exogenous individual non-labor income with the two thresholds $b_i^*, b_i^{**}$, enables to discuss conditions under which individuals prefer the PHI and give birth to a higher number of children than in the SHI. Applying Proposition 1 and Lemmas 1 and 2 leads to Proposition 2 that summarizes the possible cases.

**Lemma 2** ***Order of non-labor income thresholds***

1. *In case of* $(1 - \tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega}$*:*
   *There exists a parental premium to the PHI* $\hat{\hat{x}}_i$ *that determines the order of non-labor income thresholds for fertility* $\hat{b}_i^*$ *and the health insurance choice* $\hat{b}_i^{**}$*. The non-labor income threshold on the health insurance choice exceeds the critical value on fertility,* $\hat{b}_i^* < \hat{b}_i^{**}$*, if* $x^k \rho_i - a\,(1-\rho_i) + (\rho_i H_i - (1-z)\,h_i)\,\tau w_i > 0$ *and* $x_i < \hat{\hat{x}}_i$*; but* $\hat{b}_i^* > \hat{b}_i^{**}$ *if* $x_i > \hat{\hat{x}}_i$*. Situation is reversed if* $\tau w_i\,(\rho_i H_i - (1-z)\,h_i) + x^k \rho_i - a\,(1-\rho_i) < 0$*. Then,* $x_i < \hat{\hat{x}}_i$ *leads to* $\hat{b}_i^* > \hat{b}_i^{**}$*, and* $x_i > \hat{\hat{x}}_i$ *to* $\hat{b}_i^* < \hat{b}_i^{**}$*.*

2. *In case of* $(1 - \tau n_{i,j})\,\omega_{i,j} > \bar{\omega}$*:*
   *Likewise, a parental premium to the PHI* $\tilde{\tilde{x}}_i$ *exists s.t. the non-labor income threshold on fertility is smaller than on the health insurance choice,* $\tilde{b}_i^* < \tilde{b}_i^{**}$*, if* $\tau w_i\,(\lambda_i H_i - h_i) - (1-\lambda)\,a + \lambda_i x^k > 0$ *and* $x_i < \tilde{\tilde{x}}_i$*. Otherwise, if* $x_i > \tilde{\tilde{x}}_i$ *then* $\tilde{b}_i^* > \tilde{b}_i^{**}$*. If* $\tau w_i\,(\lambda_i H_i - h_i) - (1-\lambda)\,a + \lambda_i x^k < 0$*, then* $x_i < \tilde{\tilde{x}}_i$ *leads to* $\tilde{b}_i^* > \tilde{b}_i^{**}$*, and* $x_i > \tilde{\tilde{x}}_i$ *to* $\tilde{b}_i^* < \tilde{b}_i^{**}$*.*

**Proof.** See Appendix B. ■

**Proposition 2** ***Simultaneous choice on the number of births and the type of health insurance***

*There exist a set of thresholds* $\{b_i^*, b_i^{**}\}$ *that simultaneously determines which health insurance type parents prefer and which health insurance type goes along with a higher number of births.*

1. *If* $b_i^* < b_i^{**}$*, the following 3 cases exist:*
   (a) *If* $b_i^{**} \leq 0 \leq b_i$*, then* $n_{i,SHI} > n_{i,PHI}$ *and* $U_{i,SHI} \geq U_{i,PHI}$*.*
   (b) *If* $b_i^* \leq 0 < b_i^{**}$*, then:*
      - *If* $0 \leq b_i \leq b_i^{**}$*, then* $n_{i,SHI} \geq n_{i,PHI}$ *and* $U_{i,SHI} \leq U_{i,PHI}$*.*
      - *If* $b_i^{**} < b_i$*, then* $n_{i,SHI} > n_{i,PHI}$ *and* $U_{i,SHI} > U_{i,PHI}$*.*
   (c) *If* $0 < b_i^* < b_i^{**}$*, then:*
      - *If* $0 \leq b_i \leq b_i^*$*, then* $n_{i,SHI} \leq n_{i,PHI}$ *and* $U_{i,SHI} < U_{i,PHI}$*.*
      - *If* $b_i^* < b_i \leq b_i^{**}$*, then* $n_{i,SHI} > n_{i,PHI}$ *and* $U_{i,SHI} \leq U_{i,PHI}$*.*
      - *If* $b_i^{**} < b_i$*, then* $n_{i,SHI} > n_{i,PHI}$ *and* $U_{i,SHI} > U_{i,PHI}$*.*

*2. If $b_i^* > b_i^{**}$, the following 3 cases exist:*

*(a) If $b_i^* \leq 0 \leq b_i$, then $n_{i,SHI} \geq n_{i,PHI}$ and $U_{i,SHI} > U_{i,PHI}$.*

*(b) If $b_i^{**} \leq 0 < b_i^*$, then:*

- *If $0 \leq b_i \leq b_i^*$, then $n_{i,SHI} \leq n_{i,PHI}$ and $U_{i,SHI} \geq U_{i,PHI}$.*
- *If $b_i^* < b_i$, then $n_{i,SHI} > n_{i,PHI}$ and $U_{i,SHI} > U_{i,PHI}$.*

*(c) If $0 < b_i^{**} < b_i^*$, then:*

- *If $0 \leq b_i \leq b_i^{**}$, then $n_{i,SHI} < n_{i,PHI}$ and $U_{i,SHI} \leq U_{i,PHI}$.*
- *If $b_i^{**} < b_i \leq b_i^*$, then $n_{i,SHI} \leq n_{i,PHI}$ and $U_{i,SHI} > U_{i,PHI}$.*
- *If $b_i^* < b_i$, then $n_{i,SHI} > n_{i,PHI}$ and $U_{i,SHI} > U_{i,PHI}$.*

**Proof.** See Appendix B. ■

Irrespectively of whether individuals contribute to SHI by labor income tax or lump-sum transfer, six possible cases for the simultaneous choice on the number of births and the type of health insurance exist, presented in Proposition 2. Only the values of the thresholds differ, see Eqs. (8) and (11). Figure 3 illustrates the six possible cases graphically. Panels 1A–C on the LHS show cases for $b_i^* < b_i^{**}$ which might occur if it is relatively expensive to insure children. By contrast, if they are relatively cheap compared to their parents the threshold on the number of births, $b_i^*$, is higher than the one on the health insurance type, $b_i^{**}$. Panels on the RHS show these cases for $b_i^* > b_i^{**}$.[33] A low wage rate $w_i$, high premia to the PHI $x_i, x^k$, and a missing positive impact on the health status make the statutory health insurance preferable in both figures on the top. Parents prefer the statutory health insurance which is characterized by a higher fertility, $b_i \geq 0 > b_i^*, b_i^{**}$.

Stepwise increasing the wage rate and the impact of the private health insurance on the health status as well as lower premia lead to intermediate cases illustrated in the middle of Figure 3. If it is relatively expensive to insure children privately compared to their parents, illustrated on the LHS, statutorily insured parents still give birth to more children for the whole range of positive non-labor incomes. Nevertheless, for low non-labor incomes they prefer a membership in the private health insurance which goes along with a higher utility if $b_i < b_i^{**}$. By contrast, if their own premia are relatively high compared to their children's, they always prefer the SHI. But, as long as $0 < b_i < b_i^*$, privately insured parents would give birth to more children than if they would be members in the SHI, as shown in Panel 2B of Figure 3.

[33]Note that this is only one possible intuitive explanation. Lemma 2 illustrates that the whole parameter setting determines the order of the thresholds $b_i^*, b_i^{**}$.

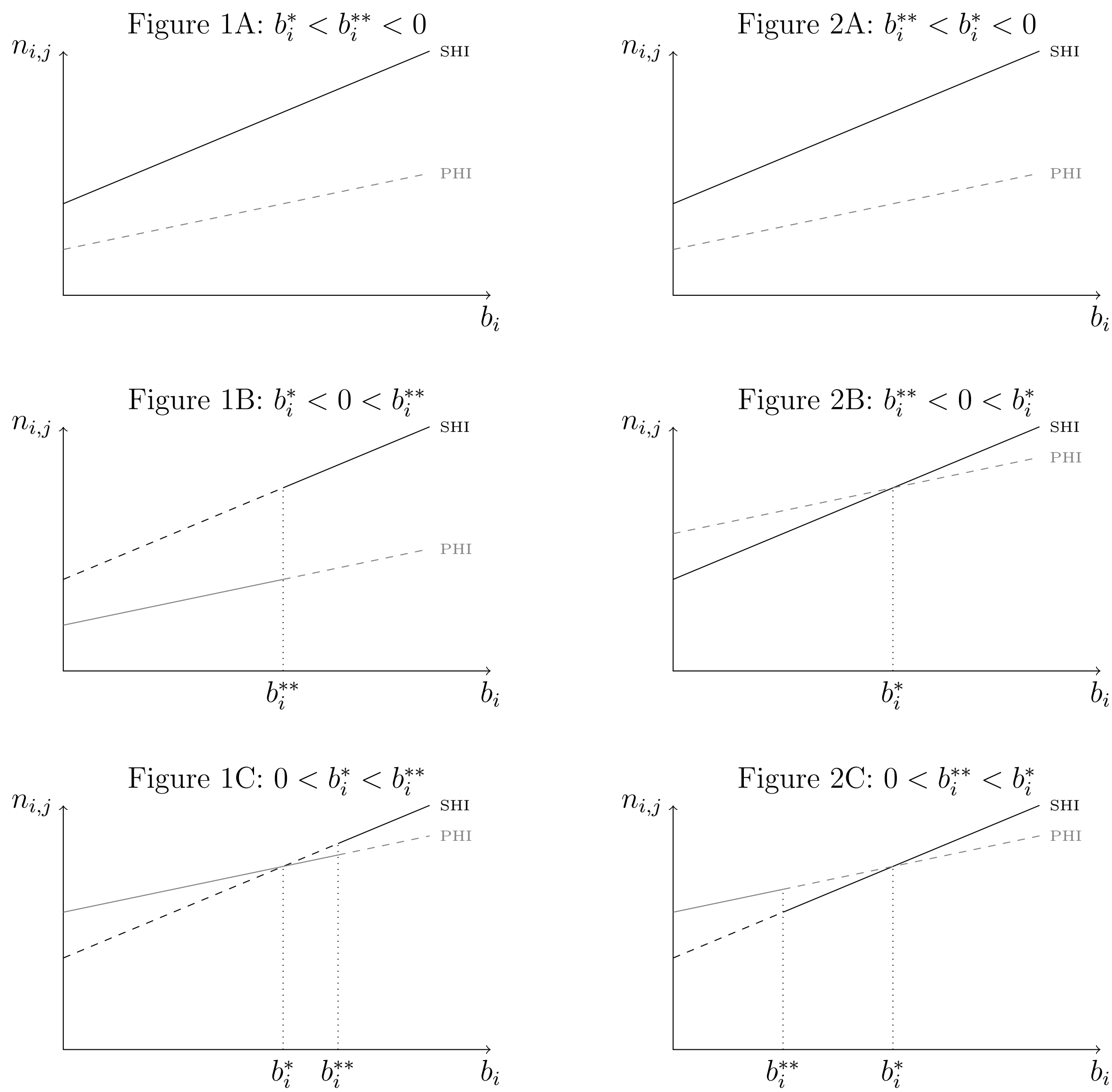



Figure 3: Impact of non-labor income on the number of births and the preferred health insurance type

Figures 1A–C illustrate cases with $b_i^* < b_i^{**}$ and Figures 2A–C with $b_i^* > b_i^{**}$ for varying values of $b_i^*$ and $b_i^{**}$. Dashed black lines mark the number of births in the SHI and gray lines in the PHI. Solid lines mark the number of births if the type of health insurance is preferred.

Finally, both thresholds are positive in illustrations on the bottom, caused, for instance, by high wage rates and a high impact of the PHI on health status. If parents' contributions are relatively cheap compared to their children's ones, illustrated in Panel 1C, a private health insurance is prefered and goes along with the higher number of births for low non-labor incomes $0 < b_i < b_i^*$. Parents still prefer to be privately insured for intermediate non-labor incomes but give birth to fewer children than they would have done in the SHI $b_i^* < b_i < b_i^{**}$. If non-labor income further increases, the advantage of a higher income net of parents' premia to the PHI dominates less and less the disadvantage of higher costs of children. The overall advantage of the PHI disappears and parents prefer a membership in SHI which goes along with a higher number of births than a private health insurance would do, $b_i > b_i^{**}$. Findings are the same for low and high non-labor incomes if children's premia are relative cheap compared to their parents' ones. Nevertheless, for intermediate non-labor incomes such that $b_i^{**} < b_i < b_i^{*}$, they prefer to stay in SHI even though they would have realized a higher number of births in PHI.

Obviously, the two-tier German health insurance system is much more complex than the simple model presented above. Still, it illustrates that a higher number of births in the SHI than in the PHI is not straight forward. The latter implies higher costs per child compared to the SHI, organized as family insurance. Nevertheless, parents' premia to the PHI might be much smaller than in the SHI. In this case, the income net of contributions to the health insurance might be higher. If this income effect is sufficiently strong, parents might give birth to more children, even if they are more expensive, and prefer the PHI. The next section presents an empirical investigation to discuss the impact of the type of health insurance on the number of births in Germany. In a first step, I present the data and some descriptive statistics. Afterwards, I apply an endogenous treatment effects model for count data to estimate the impact of health insurance types on the number of births.

# 4 Empirical investigation

## 4.1 Data set

In order to highlight the link between the number of births and the type of health insurance, I rely on data from the German Socio Economic Panel (GSOEP). The household panel provides data on births, the type of health insurance as well as general socio-economic variables.[34] To edit data, I first combine all required variables in the waves 1984 to 2013 using PanelWhiz.[35] A first challenge emerges because the survey records socio-economic variables and in particular the type of health insurance only annually. If women change the type of health insurance and give birth between two interviews, the order of the two events is not clear. She might have first given birth and then changed the type of insurance or the other way around. To overcome this problem of interval censoring, I assume that the type of health insurance and all other covariates recorded

[34]Information on fertility and health insurance status in Germany is rarely available. Neither micro census nor other official statistics offer suitable data on this topic.

[35]The data used in this paper was extracted using the Add-On package PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Hahn and Haisken-DeNew (2013) and Haisken-DeNew and Hahn (2010) for details. The PanelWhiz generated DO file to retrieve the data used here is available from me upon request. Any data or computational errors in this paper are my own.

in the interview hold the whole calendar year. Furthermore, women's age is set to the value at the end of the year. As these assumptions potentially bias the empirical investigation, I discuss their implication in the robustness checks (Section 5.5).

Once the timing of events and exposures, women's period under risk to give birth (age 18–49), are fixed,[36] I exclude events and exposures from the year of the last interview. This is required to avoid a downward bias in fertility. While the whole year would be taken into account as exposure, only those children born before the interview would be considered. All events between the interview and the end of the year would be missing.

Comparing the number of births as events with the person-years of women in fertile age as exposures to risk enables to estimate age-specific fertility rates (ASFR) and total fertility rates (TFR). They are presented in the next subsection on descriptive statistics. Afterwards, I investigate the fertility level by endogenous treatment effects models for count data.

## 4.2 Descriptive statistics

With respect to fertile age 18–49, GSOEP captures 19,908 women with 149,713 person-years and 6,306 births between 1984 and 2012. As no consistent information on the type of health insurance is available before 1999, the present investigation restricts to the period thereafter. 14,992 women remain, which are observed for 5.38 years on average. They bear 3,288 children, related to overall 87,052 person-years.

Table 3: Events and exposures to risk since 1999

| | All | SHI | PHI | No Ins. |
|---|---|---|---|---|
| Persons | 14,992 | 13,479 | 1,953 | 61 |
| Person-years | 87,052 | 72,533 | 7,785 | 82 |
| Events* | | | | |
| 0 | 83,834 | 69,802 | 7,516 | 80 |
| 1 | 3,161 | 2,690 | 261 | 2 |
| 2 | 56 | 40 | 8 | 0 |
| 3 | 1 | 1 | 0 | 0 |
| No. of Birth: | 3,288 | 2,773 | 277 | 2 |

* Events per observation, each observation implies one person-year.

Source: GSOEP; own calculations.

[36] In the adult questionnaire, GSOEP only includes individuals that have at least their 18th birthday in the survey year (Rahmann and Schupp, 2013).

Table 3 summarizes the number of women, person-years and events by health insurance type. With only 82 person-years related to women without any health insurance or 0.1% of all person-years with information on the type of health insurance, the number is too low to investigate the impact of health insurances compared to non-insured women. Taking into account exclusively person-years of women either in the SHI or the PHI, 80,318 years under risk remain, whereat 90.3% are related to the SHI and 9.7% to the PHI.[37] The distribution of the number of births is similar. Women in the SHI bear 90.9% out of 3,050 births. Remaining 9.1% are born by women in the private health insurance. These values correspond to generalized fertility rates (GFR) of 38.2 births per 1000 women in age 18–49 in the SHI and of 35.6 in the PHI.

In order to provide more precise information on the interaction between fertility and health insurance types, the next subsection presents TFRs and ASFRs by health insurance type. Afterwards, I briefly discuss premia of privately insured women and whether health status of privately insured women differs from statutory health insurance members around the time of birth as well as in the whole fertile period.

### Fertility by type of health insurance

In the period 1999 to 2012 Germany's total fertility rates ranged between 1.331 (2006) and 1.394 (2010).[38] The average TFR of 1.27 estimated from GSOEP clearly remains below the value of 2006. Absence of ages 15 to 17 in the estimation by GSOEP partially explains this difference. Furthermore, potential troubles of weights included in GSOEP might contribute to the downward bias. Neglecting the probability weights (pw) increases the estimated TFR to 1.312.[39]

Table 4 highlights fertility distinguished by statutory and private health insurance. If one only considers exposures to risk and events of women, where information on the type of health insurance is available, the TFR slightly increases to 1.272; a value strongly dominated by the 90% of women in the SHI with a TFR of 1.269. On average, women in the PHI have 0.012 children less than in the SHI. However, their TFR of 1.257 is not statistically below the fertility in the SHI. By contrast, age-specific fertility rates in Figure 4 show significant differences. ASFRs of women in the PHI have a clear peak in the age group 30–34, which accounts for 117 births per 1000 women or 46.6% of all births. Fertility among female members in SHI is less concentrated. The shape of ASFRs is flatter. With ASFRs of 82.8 and 83.6 births per 1000 women, fertility of women in age groups 25–29 and 30–34 is almost the same. Furthermore, ASFRs in early ages are significantly higher than in the PHI. Hence, members of SHI tend to give birth significantly earlier.

[37] Since 9 out of 10 individuals in Germany are in the statutory health insurance (Janßen and Frie, 2006), the distribution is consistent with observations.

[38] Datasource is the Human Fertility Database.

[39] Appendix C documents the method applied to calculate TFRs and confidential intervals. Furthermore, it includes non-weighted results.

Table 4: TFRs according to GSOEP

| | TFR | Confidence 95% | |
|---|---|---|---|
| ALL | 1.339 | 1.292 | 1.386 |
| ALL since 1999 | 1.270 | 1.203 | 1.337 |
| $\text{All}_{\text{Ins}}$ | 1.272 | 1.205 | 1.340 |
| PHI | 1.257 | 1.010 | 1.504 |
| $\text{PHI}_{\text{Pay}}$ | 1.365 | 1.074 | 1.657 |
| $\text{PHI}_{\text{Fam}}$ | 0.713 | 0.275 | 1.151 |
| SHI | 1.269 | 1.199 | 1.339 |
| $\text{SHI}_{\text{Man}}$ | 1.232 | 1.144 | 1.321 |
| $\text{SHI}_{\text{Vol}}$ | 1.250 | 1.015 | 1.485 |
| $\text{SHI}_{\text{Fam}}$ | 1.389 | 1.231 | 1.547 |
| $\text{SHI}_{\text{Stu}}$ | 1.417 | 1.109 | 1.726 |

Total fertility rates in the private health insurance (PHI), as self paying member ($\text{PHI}_{\text{Pay}}$) or covered by a family member ($\text{PHI}_{\text{Fam}}$), and in the statutory health insurance (SHI), distinguished by mandatory ($\text{SHI}_{\text{Man}}$), voluntary ($\text{SHI}_{\text{Vol}}$) and members insured by a family member ($\text{SHI}_{\text{Fam}}$). $\text{SHI}_{\text{Stu}}$ mostly comprises students and pensioners. $\text{All}_{\text{Ins}}$ excludes individuals with incomplete information on the type of health insurance. Source: GSOEP; own calculations with robust standard errors and probability weights.

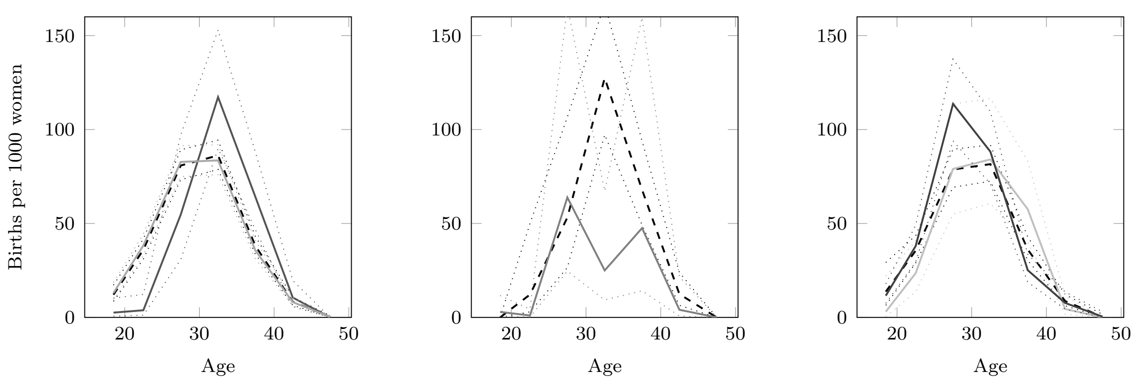



Figure 4: Age-specific fertility rates by health insurance status

Left Panel: ASFR overall (dashed black), in PHI (dark gray) and SHI (medium gray). Middle Panel: ASFR in PHI distinguished by self paying members (dashed black) and women covered by family members (medium gray). Right Panel: ASFR in SHI, distinguished by mandatory (dashed black) and voluntary members (light gray) as well as those insured by a family member (solid dark gray). Dotted lines mark 95% confidence intervals. Source: GSOEP; own calculations with robust standard errors and probability weights.

Additionally, data provided by GSOEP enables to distinguish insurance status of women within the SHI and the PHI. The majority of all women in age 18 to 49 (54.3%)

are mandatory members in the statutory health insurance. Their TFR of 1.232 is slightly below the average in the SHI and the lowest among female SHI members. Like mandatory members, those insured as students, retirees and family members have (generally) no choice between the PHI and the SHI.[40] A very low or even no labor income combined with a spouse in the SHI characterizes women insured as family members. Already the premium of the partner covers the women and the TFR is higher than those of mandatory members. Furthermore, ASFRs have a clear peak within the age group 25–29. By contrast, the partner needs to insure the woman separately if she is a family member in the PHI. The additional costs lead to a much lower fertility. On average, women only bear 0.713 children. Finally, the voluntary members in the SHI are of particular interest, as they may choose between the PHI and the SHI. Additionally, they generally have a similar professional or income situation as members of the PHI. On average, voluntary female members in the SHI give birth to 1.25 children. Surprisingly, fertility of paying members in the PHI insurance is 9.2% higher than those of voluntary SHI members. Women have 1.365 offspring – more than the German average and hence almost the same fertility as women insured as family members in the SHI. In addition to the relatively high fertility, a clear peak in the age group 30–34 underlines the differences in ASFRs. A much flatter pattern without a clear peak characterizes ASFRs of voluntary and paying members in the SHI.

### Contributions to private and statutory health insurances

A lower premia of privately insured individuals might lead to a higher number of births in the private health insurance although children are more expensive than in the statutory health insurance. While contributions to the latter are generally determined by labor income, premia of privately insured individuals are subject to a variety of individual characteristics, like age, health situation, tariff plan and so on. To illustrate how contributions to the private and statutory health insurance may differ, I use information on the privately insured women in fertile age in 2010 from GSOEP and focus on two cases: In Figure 5A couples are paying members of the private health insurance. In Figure 5B, only the woman is privately insured. Her husband is a member of the statutory health insurance.[41]

[40] Students, retirees and so on insured in the SHI are of limited interest. A women studying during the whole fertile age is a quite hypothetical situation. Additionally, the problem of very limited observations in some age groups occurs.

[41] I only include these two types of women and neglect privately insured women who cover their men as well as all women privately insured by their husbands. Furthermore, I exclude all women with missing information on the premia to the PHI or the gross labor income. Overall, 72 women remain in Figure 5A and 61 in Figure 5B.

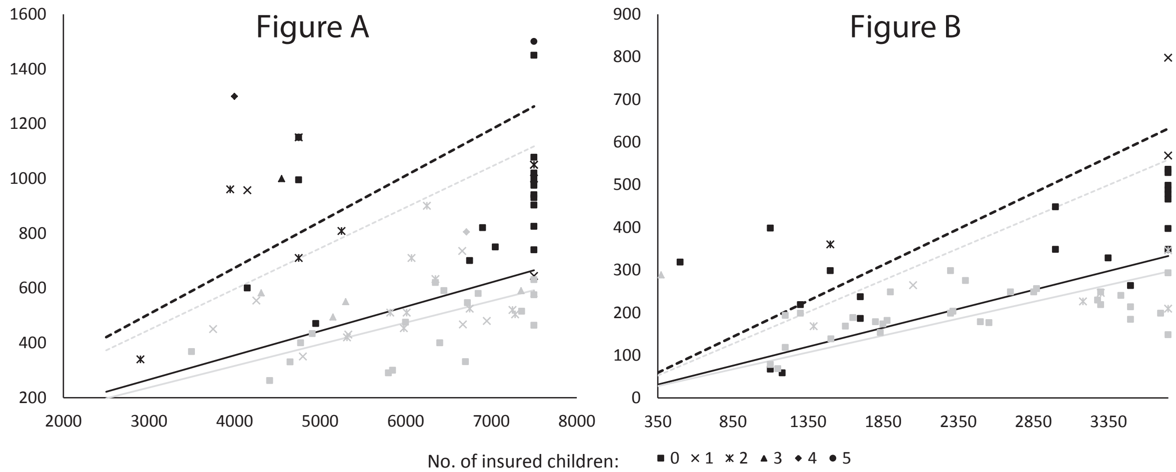



Figure 5: Contributions to private and statutory health insurance in 2010

Figure A: Contributions of privately insured couples. Figure B: Contributions of privately insured women with husband in SHI. Gray markers illustrate families where women are civil servants. If women are not civil servants, families are labeled in black. Solid lines mark employee's fictive contributions to SHI and dashed lines additionally include employer's contributions. Contributions to statutory health insurance without statutory nursing care insurance in gray and with statutory nursing care insurance in black. Source: GSOEP; own calculations.

GSEOP directly records the premia to the PHI. Additionally, I calculate individuals'/couples' hypothetical contributions to the statutory health insurance in four scenarios by means of gross labor incomes in Figure 5. Solid gray lines present employee's contribution to SHI conditional on her/their labor income which is subject to the social insurance contributions (7.9% of her/their monthly gross labor income). Black solid lines illustrate her/their contributions if the statutory nursing care insurance is included (0.975%). Dashed gray lines additionally consider employer's contribution to statutory health insurance (7.0%). Finally, the dashed black lines add his contribution to the statutory nursing care (0.975%) and therefore represent the full contribution. Hence, dashed black lines mark the upper limits, whereas solid gray lines characterize the lower borders.[42]

The simple exercise provides evidence that several families are better off in the private health insurance. The majority of families contribute less to the private health insurance than the upper limit in the SHI, see Figure 5. In particular, it seems to be much less expensive to insure privately if women are civil servants, illustrated by the gray markers. All families pay less than the upper limit. The majority of observations is even below lower limits represented by the solid lines. The PHI is more expensive for non-civil servants. Nevertheless, compared to the upper limit in the SHI it is often less expensive

[42] I refrain from taking into account existing subsidies to health insurances as well as 0.25%-points additional contribution for childless people who have completed their 23rd year of life in the statutory nursing care insurance (§ 55(3) SGB XI). A more detailed comparison of contributions is left for further research.

to insure privately. Even for families with children, a private health insurance often provides financial advantages. Findings for privately insured women with husbands in SHI are similar. But this scenario additionally offers the opportunity to insure children in the family insurance of the husband. In this case, the family would benefit from lower premia of the mothers combined with children insured by the father in the SHI and, hence, free of charge in the family insurance. Nevertheless, in several observed cases children are privately insured.

Finally, one may wonder why some individuals are privately insured although the SHI would be cheaper. Several explanations exist. Firstly, individuals might have a tariff plan characterized by a much better medical treatment. Secondly, the insurance might have been cheaper when individuals switched to the PHI. Thirdly, some tariff plans reimburse parts of the premium if individuals do not submit bills within a certain period.

**Health status in the private and statutory health insurance**

Additionally to varying contribution schemes, the illustrative model captures a potential impact of health insurance types on fertility via health status. The initial health status determines the risk premium in the PHI and thereby influences the health insurance choice. Once individuals are privately insured, this might affect health compared to members in the SHI, as the catalogue of benefits differs.[43] Hence, it is worth to have a look on the health status of women conditional on the type of health insurance and giving birth.[44] To identify the health situation of women in fertile age 18–49, I rely on the variable "self reported health status".[45]

Figure 6 illustrates the health status related to the type of health insurance. The two right hand side bars in each category compare women within the overall fertile period in private and statutory health insurance. The share of privately insured women in very good and good health is significantly higher than in SHI. Simultaneously, a higher share of women in the SHI reports a satisfactory, poor or bad health – indicating a better health in the private health insurances. As soon as the analysis restricts to the years around birth, significance of most differences vanishes due to limited numbers of observations. Only the share of individuals in poor health is significantly higher in the SHI than in the PHI in the year of birth. Pooling individuals with at least good health in the category good health, as well as women with satisfactory, poor and bad into poor health, those with better health have a slightly higher share in the PHI during the

[43]Hullegie and Klein (2010) find evidence for a positive impact of the PHI on the health status in Germany.

[44]Additionally, one may wonder if privately insured children are in better health than statutorily insured children. A better health status might reduce their costs or increase utility. Nevertheless, as these mechanisms are not included in the model, I focus on women and their self-reported health status here.

[45]The variable *Health problems for more than 6 months* is an alternative measurement. However, as only a few observations remain after excluding missing values, I use the self-reported health status.

years around birth (the year before (t-1), of birth (t) and one year after birth (t+1)). Accordingly, the share of individuals not in very good or good health status is higher in SHI. Still, differences are quite small and only indicate weak tendencies.

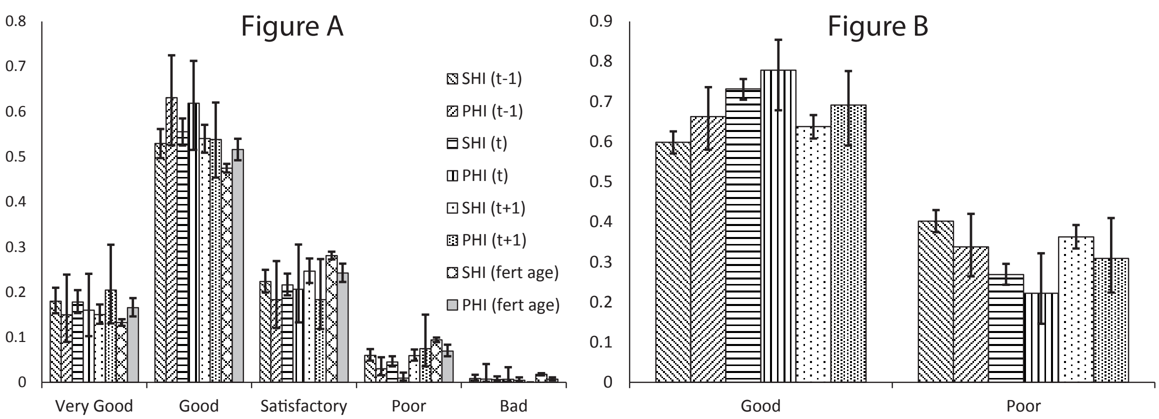



Figure 6: Self-reported health status by type of health insurance

Figure A: Share of individuals in % by health status in the SHI and PHI one year before (t-1), during the year of birth (t) and one year after (t+1), as well as during the whole fertile age (fert age). Figure B: Health status around birth recorded in 2 categories: "Good" includes women with at least good health and "Poor" all remaining women. Source: GSOEP; own calculations with probability weights.

In both types of insurance the share in better health follows an inverse U-shape. Women report a better health status in the year of birth than directly before and afterwards. This effect is either explained by better health or simply follows the inverse U-shape of women's happiness around birth (Myrskylä and Margolis, 2014).[46]

## 4.3 The impact of the health insurance type on fertility

### Estimation strategy

Fertility is a typical example for the application of count data models, see e.g. Winkelmann (2013).[47] The number of births as events is compared to the years in fertile age as exposures to risk. They are summarized in Table 5 and point to two potential issues: First, there is a high number of missing if I only include observations with full information on explanatory variables. In particular the share of individuals in younger age groups is reduced. Going along with this lower share, individuals insured as students or family members as well as in lower educational classes shrinks. Appendix D presents more details. Second, due to the very limited number of observations with more than one event, one may wonder if a logistic model is more appreciate than a count data

[46]Note that these findings might be particularly affected by the interval censoring and hence biased.

[47]Baudin (2015) and Miranda (2010) are only two examples of more recent papers applying count data models on fertility.

model.[48] Nevertheless, thanks to the "law of rare events" the Poisson distribution approximates the Binominal distribution quite well if the mean is low and the number of observations high (Cameron and Trivedi, 1998). With 38,760 and 20,885 observations and a mean of 0.0348 and 0.0394 per person-year the given distribution fulfills this assumptions in the full sample and the one limited to observations with information on the partner, respectively. Comparing the observed and theoretical distribution indicates a quite good fit. Additionally, Chi-square tests on the distribution do not reject the assumption of a Poisson distribution. Hence, I rely estimations in this section on this distribution. Nevertheless, I propose Logit and Probit estimations as robustness checks – in particular as they offer an additional interpretation: The occurrence of a pregnancy instead of the number of children born during one observation is studied. In other words, only one event per observation is taken into account.[49]

Table 5: Events and exposures to risk since 1999 to test for Poisson distribution

| | Observations | | | Poisson | Observations | | | Poisson |
|---|---|---|---|---|---|---|---|---|
| | SHI | PHI | Total | Total | SHI | PHI | Total | Total |
| Persons | 7793 | 1040 | 8462 | | 4618 | 650 | 5092 | |
| Person-years | 34918 | 3842 | 38760 | | 18652 | 2233 | 20885 | |
| Events* | | | | | | | | |
| 0 | 33744 | 3690 | 37434 | 37435.2 | 18952 | 2127 | 20079 | 20079.0 |
| 1 | 1158 | 146 | 1304 | 1301.9 | 688 | 102 | 790 | 790.3 |
| 2 | 16 | 6 | 22 | 22.6 | 12 | 4 | 16 | 15.6 |
| 3+ | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0.2 |
| No. of Birth: | 1190 | 158 | 1348 | 1348.0 | 712 | 110 | 822 | 822.0 |
| p-value** | – | – | 0.9807 | | – | – | 0.9981 | |

* Events per observation, each observation implies one person-year.

** p-value from Chi-square test with H0: observations are Poisson distribution.

Source: GSOEP; own calculations.

To investigate the impact of the type of health insurance on fertility, one has to consider characteristics of the dual German health insurance system. It suggests a self

[48] Event history or survival analysis offer another possible framework to study fertility. They study the timing of giving birth and hence focus on a dynamic perspective. By contrast, I study fertility from a cross-sectional perspective, as I observe women on average only for a very small part of their fertile period (5.38 years). Furthermore, this approach is better in accordance with the simple static model to illustrate potential mechanisms. For examples using the GSEOP see, for instance, Kreyenfeld (2010).

[49] Compared to Logit and Probit models, count data models also provide the opportunity to consider the length of a period in the exposures.

selection in the PHI that is determined by observable and unobservable heterogeneity. The number of co-insured, health status and income are prominent examples for observable individual characteristics. By contrast, risk aversion, preference for children or careerism are unobservables that might alter the type of health insurance. Simultaneously, these unobservables might affect fertility. The endogenous treatment effects (or switching) model for count data (ET-model) explicitly takes care of this kind of endogeneity problem between a binary regressor and the outcome variable. Estimated with pooled data, it controls for unobservables that affect both the number of births ($y_{it}$) and the type of health insurance ($insurance_{it}$) as endogenous binary treatment. With the number of births assumed to be Poisson distributed, I can apply the following estimation model:

$$E\left(y_{it}|insurance_{it}, x_{it}, \varepsilon_{it}\right) = \exp\left(\beta_0 + \beta_1 insurance_{it} + x'_{it}\gamma + \varepsilon_{it}\right),$$

with $x_{it}$ as vector of covariates and $\varepsilon_{it}$ as unobservables that affect fertility. The baseline model includes the set of controls 1, with *age groups*, *marital status*, *number of children 0–14 in the household in the previous year*, *migration background* and living in *West Germany*. Controls 2 adds *education* which is coded in classes following the International Standard Classification of Education. Alternative specifications extent the basic model by *civil servant status*, *health status* and *relative income*, defined as women's gross labor income related to the social security ceiling, in the previous year (controls 3) as well as characteristics of the spouse (controls 1p–3p).[50] Individuals are "treated" if they are members in the PHI, such that $insurance_{it} = 1$:

$$insurance_{it} = \begin{cases} 1, z'_{it}\delta + u_{it} > 0 \\ 0, \text{otherwise} \end{cases}$$

By contrast, $insurance_{it} = 0$ if women are in the SHI. The vector of covariates $z_{it}$ captures observables that affect a membership in the PHI and e.g. includes *health status* and *relative income* in the previous year, if women are *civil servants* and her *partner is privately health insured*. The vector $u_{it}$ captures unobserved heterogeneity that influences the type of health insurance. Both $x_{it}$ and $z_{it}$ should be unrelated to the error terms and hence exogenous variables. Endogeneity enters if $u_{it}$ and $\varepsilon_{it}$ are correlated. Unobservables exist that affect both the type of health insurance as well as the number of births. If they are positively correlated ($\rho > 0$), they increase or decrease both, the likelihood to be insured in the PHI and fertility. By contrast, a negative correlation refers to unobservables that reduce the number of births and increase the chance to be a member of the PHI or vice versa (Terza, 1998; Winkelmann, 2013; StataCorp, 2015). Thereby, the endogenous treatment model has the advantage to take care of observable as well as unobservable heterogeneity that determines the selection in the PHI explicitly.

All endogenous treatment effects models for count data apply full information maxi-

[50] Appendix D provides more detailed information on variables.

mum likelihood estimations with robust variance estimators (Greene *et al.*, 1997; Terza, 1998; StataCorp, 2015). Baseline estimations are done without probability weights, as Schnell and Trappmann (2006) find that results achieved from GSOEP sometimes differ much more from external benchmarks if weights are included. In line with their estimations, TFRs in Table 4 indicate intricacies in GSEOP's probability weights with respect to fertility.[51] Probability weights are included in estimations as a robustness check in Section 5.6. To evaluate the goodness of estimated models, I provide the Akaike information criterion (AIC) and Bayesian information criterion (BIC) and compare the predicted and observed mean.

**Estimation results**

Although higher costs per child in the PHI suggest a lower fertility, ET-models for count data evidence a positive effect of the private health insurance on the number of births. The theoretical model identifies a higher net income due to lower overall contributions to the PHI as well as a better health status as possible explanations. Table 6 summarizes estimations and Table 17 in Appendix E presents details for ET-models. Incidence rate ratios (IRR) measure the potential outcome mean in the treatment compared to the control group or in other words, the fertility ratio of private to social health insurance. Additionally, Table 6 illustrates the average treatment effect (ATE) and the average treatment effect on the treated (ATET). The former indicates the average impact of the PHI on all women in fertile age and the latter measures the average effect of the PHI on its members.

Incidence rate ratios are positive and indicate a positive impact of having a private health insurance on the number of births. In the baseline estimation (Model 1), a membership in the PHI involves a mean number of births that is 1.24 times higher than in the SHI, whereat findings on the covariates are as follows: ASFRs replicate the inverse U-shaped pattern plotted in Figure 4. In line with Kreyenfeld (2010), married women living together with their husband have a significantly higher fertility than women in all other family forms and the number of births in East is higher than in West Germany. While I also find a positive impact of education on fertility, migration background does not significantly affect the number of births.[52] Finally, it is less likely to give birth if more than one child already lived in the household one year before giving birth.

[51]Systematic selection, informative censoring as well as not well defined estimations of weights, e.g. due to missing variables, are possible explanations (Heller and Schnell, 2000; Schnell and Trappmann, 2006). Pros and cons of weighting survey data are widely discussed in the literature. For a general discussion on weights, see e.g. Winship and Radbill (1994), Chromy and Abeyasekera (2005) or Fienberg (2009).

[52]Kreyenfeld (2010) estimates a significantly higher relative risk to give birth to the first child among foreigners instead of Germans. Highlighting the transition to first birth, going along with a different estimation strategy, as well as varying time periods and specifications of covariates and their classes generally limit comparability of results.

Table 6: SUMMARY OF ESTIMATED ET-MODELS FOR COUNT DATA

| Model | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Controls 1 | x | x | x | x |
| Controls 2 | x | x | x | x |
| Controls 3 | | x | | x |
| Controls 1p | | | x | x |
| Controls 2p | | | x | x |
| Controls 3p | | | | x |
| IRR-PHI | 1.2449** | 1.2588* | 1.2901** | 1.5455** |
| IRR-PHI partner | | | 1.0296 | 0.9557 |
| Controls 1 | x | x | x | x |
| Controls 3 | x | x | x | x |
| Controls 1p | | | x | x |
| Controls 3p | | | x | x |
| N | 38760 | | 20885 | |
| Observed mean | 0.0348 | | 0.0394 | |
| Predicted mean | 0.0348 | 0.0348 | 0.0394 | 0.0394 |
| AIC | 25281 | 25286 | 13090 | 13109.7 |
| BIC | 25726 | 25799 | 13622 | 13769.28 |
| ATE | 0.0083* | 0.0088* | 0.0111* | 0.0205** |
| ATET | 0.0081** | 0.0085* | 0.0111** | 0.0174*** |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls 1: Age groups, marital status, household members age 0–14 in $t-1$, migration background, West Germany; Controls 2: Education; Controls 3: Civil servant status, previous rel. income, previous health status; Controls 1p: Partner in PHI; Controls 2p: Partner's education; Controls 3p: Previous health status, previous relative income and civil servant status of the partner.
Source: GSOEP; own estimations with robust variances.

Taking additionally into account previous relative income, previous self-reported health status and if women are civil servants slightly increases the IRR to 1.26 in Model 2. Whereas fertility increases in previous relative income, it does not matter if women are civil servants. The impact of women's previous health status is limited, too. Only women with poor health in the previous year have a higher fertility than those with very good health. While the predicted mean per 1000 person-years in both models (34.78) reproduces the observed mean (34.78), AIC and BIC are slightly lower in Model 1 than Model 2. Hence, the former is slightly preferable and serves as basic model.[53]

[53] Additionally covariates like, religiosity, distance to grandparents, number of brothers and sisters or age of first marriage might affect fertility. In West Germany Hank *et al.* (2004), for instance, evidence a positive impact of grandmothers living close on fertility. But they find no effect at all in East Germany. Nevertheless, due to data issues, like a high share of missings, irregularly collected information, I focus

Model 3 and 4 only include events and exposures of women if information on the partner are available. Taking into account partner's education and type of health insurance increases the IRR to 1.29 in Model 3. Women with highly educated men have a slightly higher fertility, while his type of health insurance does not matter. The IRR of partner's health insurance is slightly above one but the difference is not significant. In Model 4, that controls in addition for his previous health status, relative income as well as his civil servant status, the IRR of partner's health insurance type shrinks to 0.96. Hence, a partner in the PHI has a negative (but not significant) impact on fertility. Simultaneously, her membership in the PHI has the highest positive effect on the potential mean number of births. Potential average fertility of women in the PHI is 1.55 times higher than in the SHI. Except his education, none of his controls has a significant impact on her fertility. Furthermore, the impact of women's previous relative income is not significant anymore. The same is true for the variable West Germany.

Beside variables that influence the number of births, it is worthwhile to have a brief discussion on observables that affect women's type of health insurance. As suggested by Germany's rules discussed above, healthy women with high income and civil servants are more likely a member in the PHI. Surprisingly, findings on the number of children are not in line with the idea that women with children are less likely in the private health insurance, see for example Dräther (2006). Women with less than 4 children below age 15 in the household have a significantly higher probability to be privately insured than childless women. As soon as the threshold of 4 children is reached, a membership in the PHI is less likely (Model 3 and 4) or no significant difference exits. Furthermore, migrants and women from East Germany are less likely privately insured. Finally, a privately insured partner increases the likelihood of the women to be a member of the PHI. By contrast, the fact that the partner is a civil servant does not influence or even negatively alters the probability to be privately insured if he is a low- or middle-level civil servant. Furthermore, partner's previous health status and relative income do not influence her probability to be privately insured. Hence, all covariates controlling for observed heterogeneity that explain the selection in the PHI have expected signs and are able to reproduce some of the characteristics of the stylized model. Women with higher gross labor income and better health status are more likely privately insured. The positive impact of women's gross labor income in Model 2 is also in line with the stylized model. By contrast, no significant impact of her or his labor income is observable in Model 4 and coefficients have opposite signs. A significant impact of health on the number of births is also not observable in Model 4 although the stylized model would allow for an impact on fertility via income.

Furthermore, estimated ET-models enable to do two kinds of counterfactual exercises. First, one might wonder how much the average potential fertility would increase if all women were in the PHI (average treatment effect (ATE)). The generalized fertility rate

on Models 1–4. Furthermore, Table 18 in Appendix E presents Models 5–8 that add the number of siblings and states instead of East and West Germany. Only a very high number of women's siblings significantly increases fertility and general findings of Models 1–4 are not altered by the alternative specifications.

in the baseline model would raise by 23.9% or 8.3 birth per 1000 person-years. The effect is even stronger if we include only women with information on the partner and control for their characteristics. The impact of the PHI is highest in Model 4 with 52.0% or 20.5 birth per 1000 women in fertile age. Second, one can estimate the average effect of the PHI on the sub-population of female members in the PHI (average treatment effect on the treated (ATET)). The impact of the PHI is in a range between 19.7% or 8.1 births per 1000 person-years in the baseline model and 35.3% or 17.4 birth per 1000 person-years in Model 4. Hence, estimated effects of the PHI are quite remarkable. Nevertheless, their magnitude should be interpreted with caution. The individuals in SHI are potentially characterized by higher risks, see Figure 6. They would increase premia in the private health insurance and reduce the income net of contributions to the health insurance. The advantage of the PHI would shrink, disappear or even turn into a disadvantage in the extreme case.

Model 1 and 2 indicate a negative correlation between treatment ($u_{it}$) and outcome errors ($\varepsilon_{it}$).[54] The negative estimated correlations ($\rho < 0$) refers to unobservables that simultaneously reduce fertility and increase the likelihood to be privately insured or vice versa. Careerism or low preferences for children are just two examples that might reduce fertility but increase the chance to be insured in the private health insurance. Neglecting the endogeneity leads to a downward bias of the estimated effect of the PHI on the number of births and thus strongly favors the endogenous treatment effect model compared to alternative approaches (Winkelmann, 2013). By contrast, taking into account only women with information on the partner changes the correlation. The remaining sub-sample is older and higher educated. Treatment and outcome errors are positively correlated in Model 3. Adding additional controls, in particular civil servant status, changes the correlation from a positive into a negative one in Model 4 even if none of the coefficients is significant. Thus, Model 4 emphasizes the role of the civil servants while Model 3 is preferable,[55] as it has a lower AIC and BIC. The next section presents alternative specifications – including a discussion on civil servants – to emphasize robustness of findings.

[54] The null-hypothesis of no correlation between the errors ($\rho = 0$) is rejected.

[55] Although civil servant status of women does not alter the number of births significantly in Model 4, the negative coefficients indicate that fertility of civil servants is slightly overestimated in Model 3, potentially causing the positive correlation in error terms. Excluding civil servants in the robustness checks will lead to a negative correlation in all models.

# 5 Robustness checks

## 5.1 Random-effects estimations in count data models

### Estimation strategy

The estimated ET-models pool data and hence neglect GSOEP's panel structure. To take advantage of the latter, a first robustness check presents random-effects models for count data (RE-model). The panel data also allows to address the issue of unobserved heterogeneity (Winkelmann, 2013). Supposing the number of births $y_{it}$ of woman $i$ in period $t$ is Poisson distributed conditional to the exponential conditional mean $\lambda_{it}$ and individual heterogeneity $\upsilon_i$: $y_{it} \sim P\left[\upsilon_i \lambda_{it}\right]$. The conditional mean is

$$\lambda_{it} = \exp\left(\beta_0 + \beta_1 insurance_{it} + \gamma x'_{it}\right),$$

whereat the vector of covariates $x_{it}$ includes the sets of controls 1 and 2 in the baseline model. Alternative specifications add controls 3 and controls 1p–3p of the spouse stepwise. The resulting model is given by

$$E\left(y_{it}|\lambda_{it}, \upsilon_i\right) = \exp\left(\ln \upsilon_i + \beta_0 + \beta_1 insurance_{it} + x'_{it}\gamma\right),$$

with the type of $insurance_{it}$ as variable of interest. The random-effects specification allows for heterogeneity between the individuals, whereat the vector of unobserved individual effects $\upsilon_i$ follows a Gamma distribution $\upsilon_i \sim \Gamma\left[1, \alpha\right]$. Instead of estimating a vector of individual effects, only one additional parameter $\alpha$ needs to be estimated. However, the RE-model requires that the unobserved individual effects $\upsilon_i$ are not correlated with the vector of explanatory variables $x_{it}$ and $insurance_{it}$. The fixed-effects model with individual specific fixed-effects would allow for this correlation, but it cannot accommodate time-invariant explanatory variables. As only a very low number of person-years would remain, the RE-model is advantageous here (Winkelmann, 2013).[56]

### Results in RE-models

Random-effect models for count data are summarized in Table 7 and support estimations in the ET-models. On average, a membership in the PHI involves a 1.23 times higher number of births per person-year than in the SHI in the baseline RE-estimation (Model 1). The IRR of Model 2 is slightly higher. Once the dataset is restricted to women with information on the spouse, her type of health insurance matters even more, while the type of health insurance of her partner has no impact. Average potential fertility in the PHI is 1.31 and 1.40 times higher than in the SHI in Model 3 and 4, respectively.

[56] For the sake of completeness, Table 20 presents the results of Model 1–4 with fixed-effects.

Overall, the RE-models find a similar impact of the private health insurance on the number of births. As suggested by the Wald-test, IRRs in Models 1, 2 and 4 are indeed slightly below the ET-models. Not taking into account the negative correlation between unobserved heterogeneity which alters the type of health insurance and number of births leads to an underestimation of the impact of the PHI (Winkelmann, 2013). The opposite holds for Model 3 with the positive correlation. Furthermore, none of the likelihood ratio tests from the 4 random-effect estimations with $\upsilon_i \sim \Gamma[1, \alpha]$ indicates that random-effects differ from pooled Poisson estimations.[57] Thus, pooling the data does not alter results and the ET-models for count data is preferable. Still, IRRs as well as coefficients of covariates only change marginally in the RE-models for count data.

Table 7: Summary of estimated RE-models for count data

| Model | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Controls 1 | x | x | x | x |
| Controls 2 | x | x | x | x |
| Controls 3 | | x | | x |
| Controls 1p | | | x | x |
| Controls 2p | | | x | x |
| Controls 3p | | | | x |
| IRR-PHI | 1.2338*** | 1.2384** | 1.3059*** | 1.4011** |
| IRR-PHI partner | | | 1.0268 | 0.9705 |
| N | 38760 | | 20885 | |
| AIC | 9872 | 9877 | 5644 | 5664 |
| BIC | 10086 | 10160 | 5890 | 6037 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Controls 1: Age groups, marital status, household members age 0–14 in $t-1$, migration background, West Germany; Controls 2: Education; Controls 3: Civil servant, previous rel. income, previous health status; Controls 1p: Partner in PHI; Controls 2p: Partner's education; Controls 3p: Previous health status, previous relative income and civil servant status of the partner. Source: GSOEP; own estimations with robust variances.

## 5.2 Binary outcome models with random-effects

Due to the very low number of observations with more than one event, which are especially driven by twins, I apply logistic RE-models in this robustness check. To apply logistic estimations, I only consider if women give birth ($y_{it} = 1$) or not ($y_{it} = 0$) within a period and maximize the random-effects model:

$$PR\left(y_{it} = 1 | x_{it}, insurance_{it}\right) = P\left(\beta_0 + \beta_1 insurance_{it} + x'_{it}\gamma + \upsilon_i\right)$$

[57]The null-hypothesis $\alpha = 0$ is not rejected by the LR-tests.

via maximum likelihood. The vector of covariates $x'_{it}$ and the variable of interest $insurance_{it}$ are the same as in the RE-model for count data. The unobserved individual effects are assumed to be i.i.d. normally distributed, $N(0, \sigma_\upsilon^2)$ and the error terms of the underlying model

$$y_{it} = 1 \Leftrightarrow \beta_0 + \beta_1 insurance_{it} + x'_{it}\gamma + \upsilon_i + \varepsilon_{it} > 0$$

are i.i.d. logistic distributed with zero mean and variance $\sigma_\varepsilon^2 = \pi^2/3$ (StataCorp, 2015).[58]

Table 8: Logit and count data models with random-effects

| IRR/OR in | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Count data model | 1.2338*** | 1.2384** | 1.3059*** | 1.4011** |
| Logit model | 1.2292** | 1.2449* | 1.3320** | 1.4346** |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The covariates in Models 1–4 are the same as in Table 7.

Source: GSOEP; own estimations with robust variances.

Table 8 confronts the IRR of the count data models with the odds ratios (OR) of the Logit models. Differences between the estimated ratios are small. Focusing on pregnancies per observation instead of the number of births does not change the main finding. Fertility of privately insured women is higher than those of members in the SHI.

## 5.3 Fertility by women's insurance status

Within statutory and private health insurance women are quite heterogeneous and have different insurance statuses. As GSOEP additionally offers insurance status of individuals, it is worth to use these more detailed information as a third robustness check. Therefore, this section first presents RE-models with the health insurance status instead of the type of health insurance. Afterwards, ET-models restrict to two groups of women: voluntary members in the SHI and self-paying women in the PHI. Comparing these women is of particular interest. First of all, they are exempted from the statutory health insurance and thus can choose between PHI and SHI. Secondly, they are in a similar income or occupational situation.

Relying on the health insurance status instead of the type of health insurance adjusts the variable of interest in the random-effects model:

$$E(y_{it}|\lambda_{it}, \upsilon_{it}) = \exp(\ln \upsilon_{it} + \beta_0 + \beta_1 i\text{-}status_{it} + x'_{it}\gamma),$$

[58]Alternative estimations with Probit models are presented in Table 24. General findings are similar to the Logit models.

with $i\text{-}status_{it}$ capturing the 6 possible insurance statuses from Table 4.[59] The LHS of Table 9 presents the Models 1 to 4 with the insurance status instead of the type of health insurance, whereat paying members in the PHI serve as reference group.[60] In the baseline RE-model, women voluntarily insured in the SHI only have 0.82 times the number of births in the PHI as reference group and thus a lower fertility. Adding previous health status and income as well as a civil servants drops the IRR to 0.79. As soon as estimations exclude women without information on her partner, the difference is even stronger. The number of births of voluntary insured women in the SHI is only 0.76 (Model 3) and 0.70 (Model 4) times fertility of self-paying women in the PHI. Thus, the RE-model indicates a significant positive impact of the PHI on the number of births among individuals able to choose between the two types of health insurances. IRRs of remaining health insurance statuses related to paying members in the PHI are as following: Mandatory members in the SHI only bear 0.71 to 0.78 times the number of births of self-paying privately insured women, depending on the estimated RE-model. Similarly, IRRs of family members in the SHI are quite stable across RE-models and range between 0.56 and 0.60. Within the PHI no significant difference is observable. With Model 3 as an exception, IRRs indicate a tendency to a lower fertility of women insured by their husband. IRRs comparing students, pensioners and so on in the SHI to the PHI are also smaller than one and not significant.

To model the decision of women on the type of health insurance explicitly, one can apply the endogenous treatment model on the sub-population of women that are either voluntarily insured in the SHI or self-paying members in the PHI. The RHS of Table 9[61] summarizes ET-Models 1 to 4 for the sub-population. In the baseline estimation of Model 1 the IRR of 0.99 is slightly below one. By contrast, IRRs in ET-Models 2 to 4 range between 1.09 and 1.19 but are not significantly different from one either. Consequently, ATE and ATET of ET-Models 2–4 are positive but not significant. Thus, contrary to the whole population only some weak evidence indicates a positive impact of the PHI on the number of births among the sub-population of women that are able to choose. While the RE-models find a significantly lower fertility of voluntarily insured in the SHI, no significant effect is observable in the ET-models. Excluding women not exempted from the statutory health insurance leads to IRRs between voluntarily insured women in SHI and self-paying women in PHI which are almost one or still above. The lack of significance might be due to the strongly reduced number of observations. Only 6,649 person-years in Model 1, 2 and 3,659 person-years in Model 3, 4 remain if one only takes into account for women with information on the partner.

[59] Appendix E.1 illustrates that the Poisson distribution also approximates the distribution of events in the sample with information on women's insurance status.

[60] Table 21 in Appendix E.2 documents estimation output for the count data models. Additionally, Table 26 and 27 show the RE-models with health insurance type for the Logit and Probit estimation, following the estimation strategy described in Section 5.2 with $i\text{-}status_{it}$ instead of $insurance_{it}$.

[61] Table 25 in the appendix shows coefficients of covariates and the AIC and BIC.

Table 9: Summary of estimated count data models with insurence status

| | RE-models | | | | ET-models | | | |
|---|---|---|---|---|---|---|---|---|
| Model | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| $SHI_{Man}$ | 0.7826*** | 0.7607** | 0.7688*** | 0.7093** | | | | |
| $SHI_{Vol}$ | 0.8187* | 0.7862* | 0.7571* | 0.6994** | | | | |
| $SHI_{Fam}$ | 0.5689*** | 0.5671*** | 0.5983*** | 0.5628*** | | | | |
| $SHI_{Stu}$ | 0.9534 | 0.9431 | 0.7845 | 0.7348 | | | | |
| $PHI_{Fam}$ | 0.7016 | 0.7027 | 1.0059 | 0.9374 | | | | |
| Partner in: | | | | | | | | |
| $SHI_{Man}$ | | | 0.9784 | 1.0088 | | | | |
| $SHI_{Vol}$ | | | 0.9605 | 1.0108 | | | | |
| $SHI_{Fam}$ | | | 0.5725 | 0.5881 | | | | |
| $SHI_{Stu}$ | | | 0.8740 | 0.8931 | | | | |
| $PHI_{Fam}$ | | | (0.000***) | (0.000***) | | | | |
| PHI | | | | | 0.9938 | 1.1875 | 1.0931 | 1.1246 |
| Partner in PHI | | | | | | | 1.2439 | 1.1640 |
| N | 38683 | | 20783 | | 6649 | | 3.659 | |
| ATE | | | | | -0.0003 | 0.0070 | 0.0043 | 0.0057 |
| ATET | | | | | -0.0003 | 0.0071 | 0.0045 | 0.0059 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: GSOEP; own estimations with robust variances.

## 5.4 Excluding civil servants

Almost half of the overall number of person-years of privately health insured women in fertile age belongs to civil servants. Furthermore, female civil servants themselves are highly concentrated in the PHI. As shown in Table 10, around 92% of civil servants are privately insured. To ensure that estimations do not basically capture the impact of civil servant status on fertility instead of the effect of the PHI, the next robustness check excludes all civil servants.

If civil servants are excluded, the IRR in Model 1 increases from 1.2449 in the whole sample to 1.4135.[62] By contrast, the impact of the PHI slightly shrinks in Model 2 and is not significant anymore. The potential mean number of births in the PHI is 1.2588 times the number in the SHI in the full sample and 1.2214 if civil servants are excluded. In Model 3 and 4, which include the information of the partner, IRRs increase to 1.7536 and 1.7075, respectively. Partner's type of health insurance has still no significant impact on fertility. With 0.9421 (Model 3) and 0.9399 (Model 4) IRRs are below one.

[62]Detailed estimation results are presented in Table 28 in Appendix E.2.

Table 10: Type of health insurance by civil servant status

| | No civil servant | Civil servant Low-middle | High | Executive | Total |
|---|---|---|---|---|---|
| SHI | 34759 | 63 | 73 | 23 | 34918 |
| PHI | 2021 | 508 | 935 | 378 | 3842 |
| Total | 36780 | 571 | 1008 | 401 | 38760 |

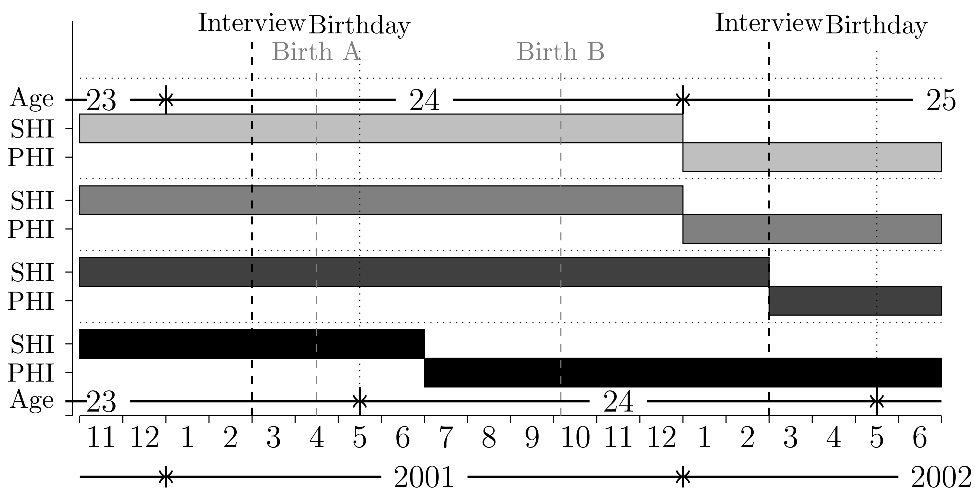
Source: GSOEP; own calculation.

Findings in the RE-models for count data are similar, see Table 29. The IRRs increase in Model 1, 3 and 4 but is a little lower in Model 2. Still, all IRRs are significantly above one. Thus, excluding civil servants from the sample reveals their impact on the investigation. First of all, it confirms the positive impact of the private insurance even if civil servants are excluded. Indeed, it seems that the influence of the private health insurance is even stronger. Secondly, the correlation between the treatment and outcome error is negative in all 4 Models.

## 5.5 Robustness of findings with respect to interval censoring

Two fundamental assumptions made so far might alter findings regarding the impact of the private compared to the statutory health insurance. First, estimations rely on the assumption that annually recorded information hold for the whole year to handle the interval censoring. Additionally, women's age is fixed to the value at the end of the year. This subsection checks robustness of findings regarding alternative assumptions. Secondly, as estimations are done without probability weights, a last robustness check in Section 5.6 discusses the role of the weights.

Figure 7 illustrates three possible assumptions to handle the interval censoring. So far, the empirical investigation relies on the baseline Assumption A0, marked by light gray in Figure 7. It assumes that the type of health insurance recorded in the interview holds the whole calendar year. The age is set to the value at the end of this year. Alternatively, Assumption A1 (medium gray) uses the true age displayed by the time bar directly above the x-axis. The true age also holds in Assumption A2, plotted in dark gray. Additionally, the woman stays in the type of health insurance recorded in the interview the whole period until the next interview. According to these assumptions, the exposure to risk as a member in SHI in age 24 increases from 2 months, as the true value, to 8 months in A1, 10 months in A2 and 12 months in A0. Simultaneously, the exposure to risk in PHI shrinks to 0 month in A0, 2 months in A2 and 4 months in A1. To be consistent, the same assumptions apply to all annually recorded covariates taken into account. Like the exposure to risk, the classification of the number of births as events might be biased. If the woman would give birth in April 2001 (birth A), the 'true' and the 'considered' observation in A1 and A2 coincide. By contrast, the event is taken into account in age 24 instead of age 23 in Assumption A0. However, if she gives birth in November (birth B), the event is attributed to SHI in A0, A1 and A2, whereas the 'true' birth belongs to the PHI. The table in Figure 7 summarizes the exposures and events of the example. As information regarding children's and the own month of birth as well as the month of interviews are missing in a high fraction of observations, Assumption A0 serves as the baseline Assumption applied above. As Assumptions A1 and A2 use more information concerning the correct timing of events and exposures, both act as robustness checks.




| | | Exposure | | | | Birth A | | | | Birth B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Insurance | true | A0 | A1 | A2 | true | A0 | A1 | A2 | true | A0 | A1 | A2 |
| 23 | SHI | 6 | 2 | 6 | 6 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 24 | SHI | 2 | 12 | 8 | 10 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 24 | PHI | 10 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 25 | PHI | 2 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Figure 7: Timing of events and exposure to risk in person-month

The survey records socio-economic variables and in particular the type of health insurance annually. This leads to interval censoring that potentially biases the empirical investigation as exemplified in Figure 7. It illustrates a fictive example to highlight how a woman born in May 1977 would be tracked between November 2000 and June 2002. Since women's fertile age (18–49) defines the period under risk to give birth, the woman in the example has an exposure to risk of 20 months. Including the month of birth to the higher age, she spends 6 months (November 2000–April 2001) in age 23. From May 2001 to April 2002 she is 12 months in age 24. Until the end of June 2001 she is a member of the SHI. Afterwards she is privately insured. Thus, the 'true' exposures are 2 months in the SHI and 10 months in the PHI in age 24. However, due to the interval censoring, I do not know the exact date of change. A membership in the SHI during the interview in April 2001 and in the PHI in March 2002 is the only information available.

Total fertility rates vary slightly across the different assumptions[63] and have the highest value in A2. The TFR in the overall period is lowest in A0. Restricting on observations since 1999, almost no difference between A0 and A1 is observable in the overall TFRs. By contrast, values are still higher in A2.

The positive impact of the private health insurance on the number of births is rather robust to different assumptions with respect to the interval censoring. IRRs below one are only observable in Model 2 under Assumption A2, but they are not significantly different from one. Nevertheless, magnitudes of the IRRs vary and should be interpreted with caution. Table 11 summarizes IRRs across RE- and ET-models, as well as ATE and ATET for the latter. Tables 30-33 in Appendix E.2 document details.

Table 11: IRR, ATE and ATET under Assumptions A0, A1, A2

| | | RE-models | | | | ET-models | | | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| | A0 | 1.233*** | 1.238** | 1.306*** | 1.401** | 1.245** | 1.259* | 1.290** | 1.545** |
| IRR | A1 | 1.209** | 1.197 | 1.199* | 1.298* | 1.224* | 1.244 | 1.173 | 1.459* |
| | A2 | 1.201** | 0.979 | 1.234** | 1.039 | 1.446*** | 0.995 | 1.449*** | 1.221 |
| | A0 | | | | | 0.008** | 0.009* | 0.011** | 0.020** |
| ATE | A1 | | | | | 0.005* | 0.005 | 0.004 | 0.010 |
| | A2 | | | | | 0.008*** | -0.000 | 0.009** | 0.005 |
| | A0 | | | | | 0.008** | 0.008** | 0.011** | 0.017*** |
| ATET | A1 | | | | | 0.004* | 0.005 | 0.004 | 0.009* |
| | A2 | | | | | 0.007*** | -0.000 | 0.009** | 0.005 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: GSOEP; own estimations with robust variances.

The IRRs in Model 1, as baseline specification, are rather robust across Assumptions A0–A2 in both RE- and ET-models. In the latter, the IRR is almost unchanged under Assumption A1 but increases to 1.446 under A2. By contrast, the average treatment effect under A0 and A2 are both 0.008 birth per person-year, while the value is much smaller in A1 (0.005). The average treatment effects on the treated are lower (0.004–0.007) but still positive and significant. Taking into account civil servant status as well as previous health status and relative income in Model 2 drops the IRRs. In both Assumptions A1 and A2 coefficients are not significant and the IRR even drops a little below one in the latter. Consequently, neither ATE nor ATET are significant. Assumption A2 goes along with an even higher IRR, but slightly lower ATE and ATET, in Model 3 that extends the baseline model with information on the partner. In Model 4, an IRR significantly above one characterizes Assumption A1, while no significant IRR characterizes A2 anymore.

[63] Estimated TFRs for Assumption A0, A1 and A2 are summarized in Table 4 and 13.

In the RE-baseline specification, values are slightly lower in A1 (1.209) and A2 (1.201) but still above one and significant. Including the information on the partner, the IRRs remain significant but also a little lower. Nevertheless, as soon as controls 3 and in particular the civil servant status are taken into account, IRRs do not differ significantly from one in A2 anymore. Nevertheless, the majority of specifications documents a positive impact of the PHI on the number of births, in particular in Models 1 and 3 which are preferable according to AIC and BIC.

## 5.6 Robustness of findings related to probability weights

The average TFR between 1999 and 2012 is 1.312 if probability weights are excluded. Compared to an estimation of 1.270 with probability weights, this value is closer to the reference values from the Human Fertility Database. More generally, TFRs estimated without probability weights are higher than estimations including the weights. Only the residual category "students, pensioners and so on" in the SHI has a higher TFR if probability weights are taken into account.[64] Furthermore, opposed to estimations without probability weights, fertility of voluntary and mandatory women in SHI is below the average in the SHI if the weights are taken into account. Deviations in the patterns of ASFRs between estimations with and without probability weights are also limited. The impact of weights on the ASFRs of women insured in the SHI by a family member is the most striking. The peak in age group 30–34 vanishes if estimations include weights.[65] Nevertheless, the two main findings from descriptive statistics persist: Firstly, fertility in the PHI is delayed and more concentrated than in the SHI. Secondly, the TFR in the SHI is slightly higher than in the PHI, even if the difference is not significant.[66]

Table 12: Summary of ET-Poisson estimations with probability weights

| Model | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| IRR | 1.1573 | 1.1586 | 1.0730 | 1.5998* |
| ATE | 0.0054 | 0.0054 | 0.0031 | 0.0243 |
| ATET | 0.0059 | 0.0059 | 0.0039 | 0.0216* |
| N | 38215 | | 20594 | |
| AIC | 67424421 | 67391878 | 28348648 | 28290479 |
| BIC | 67424865 | 67392391 | 28349179 | 28291137 |

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: GSOEP; own estimations with robust variances and with probability weights.

[64] Under Assumption A1 and A2, the TFRs of family members as well as of students and pensioners in the SHI are higher if the probability weights are considered. Additionally, weighting leads to an TFR above the non-weighted one for family members in the PHI under A1.

[65] Table 13 adds weighted and non-weighted TFRs across Assumptions A0–A2 to Table 4. Figure 8 provides ASFRs without probability weights.

[66] Under Assumption A2, PHI's TFR is slightly above the one in the SHI.

The evidence on a positive impact of a private health insurance on fertility is somewhat weaker if probability weights are taken into account. Table 12 summarizes the ET-models for count data taking into account the probability weights.[67] In line with estimations in Section 4, IRRs are larger than one if estimations include probability weights. Nevertheless, estimated coefficients are smaller than without probability weights in Models 1–3 and not significant anymore. By contrast, the IRR increases to 1.5998 in Model 4, which is preferable according to AIC and BIC, and is still significant. Furthermore, the average treatment effect on the treated of 0.0216 exceeds the non-weighted value of 0.0178. The average treatment effect (0.024) is also higher, but not significant anymore.

# 6 Conclusion

In this paper I investigate how varying incentives to give birth in the German dual health insurance system affect fertility. A stylized model with private and statutory health insurance illustrates various mechanisms that alter the number of births. Children in the SHI are less expensive than in the PHI as they are covered by family insurance. Additionally, parents' contributions to the health insurance differ. If they are higher in the PHI, the lower net income strengthens the negative impact of the PHI on fertility. By contrast, if parents' premia in the PHI are lower than in the SHI, the income effect operates in the opposite direction. As soon as this effect dominates, incentives to give birth and bring up children are higher in the PHI. The PHI has a positive impact on fertility, even if children are more expensive. A better health status, might also induce a higher fertility in the PHI.

Relying on data from GSOEP, I find evidence that having a private health insurance tends to increase fertility. The average potential number of births in the baseline model is 1.24 times higher in the private than in the statutory health insurance. The ratio of fertility in private to statutory health insurance increases to 1.29 if I restrict the sample to women with information on the partner and control for partner's characteristics. Since privately insured members are a highly selective sub-population in Germany, I apply an endogenous treatment effects model for count data to address the selection of women into the PHI. The ET-model has the major advantage to control for observed and unobserved heterogeneity that might cause this selection into the PHI. As expected, women who tend to be in good health and have a higher income are more likely to be in the private health insurance. So PHI might only appear as a proxy for women with high income and good health. Nevertheless, the positive impact of a private membership remains after controlling for gross labor income and health status in the estimations. By contrast, if the sample is restricted to women that are able to choose the type of health insurance – the women with similar characteristics – incidence rate ratios are not significantly different from one anymore. The missing significance might be caused by the fact that a membership in the PHI is just a proxy for healthy women with

[67] Table 34 in Appendix E.2 presents the estimation output.

good income. Another explanation for the lack of significance could be the much lower number of observations.

Findings are robust across several alternative specifications, including estimations with random-effects models for count data, Logit models with random-effects, different subsamples and the health insurance status instead of the health insurance type as variable of interest. While the positive impact of the PHI persists, magnitudes vary across specifications and should be interpreted with caution. Furthermore, several data issues remain. First of all, the interval censoring may bias results. While Section 5.5 showed that results are robust to different assumptions on timing, the possibility remains that the true timing is not approximated well by the set of assumptions that have been checked. Second, there might be selection bias due to the high number of missing values in the covariates. Third, age-specific fertility rates in the descriptive statistics (Section 4.2) suggest a different timing of giving birth in the two types of health insurance. To examine how the PHI might alter the timing of giving birth is left for future research.

The higher number of births in the private compared to the statutory health insurance supports arguments from Niehaus (2009). Due to inter-generational transfers from the working to the old generation, the statutory health insurance might be unfavorable for families. Although children are free of charge, parents' contributions to the SHI co-finance health expenditures for the elderly. Due to these transfers to the old, parental contributions to the SHI might significantly exceed parents' premia to the PHI. Indeed, in a simple exercise on privately insured women in 2010, I find that a high share of privately insured families would have suffered from higher contributions in the SHI. The rising share of the elderly in the population implies that the premia for the whole family is more likely to be higher in the statutory compared to the private health insurance – a situation that emphasizes the two-way interaction between health insurance and population dynamics. The increasing longevity, due to better medical care, combined with shrinking fertility raises the required contributions of the working-age generation. Hence, the population dynamic induces a lower net income. Fertility in the SHI shrinks and individuals with low health risks are pushed into the PHI which exacerbates the financial sustainability of the SHI. Higher premia are required such that there is the risk of a self-amplifying process.

One may wonder how a health insurance system should be organized in the light of supporting family policies that aim at increasing incentives to give birth. The answer is probably a combination of private and family health insurance. The fully-funded system of the PHI has the advantage to avoid that parents have to make transfers in both directions, i.e. to elderly and children. Although the working generation would still finance the children, children's health costs would not directly alter incentives to give birth because of the family insurance. Nevertheless, as is known from the literature on pensions, see for instance Breyer (2001), Brunner (1996) and Sinn (2000), the transition from a pay-as-you-go to a fully-funded system is generally challenging. Furthermore, privately insured members are a highly selective sub-population in Germany, which tends to be healthier and have a higher income. If everybody would be privately insured, the fraction of privately insured people in less good health would increase which would induce higher premia. The advantage of the private insurance would at least partially disappear. Additionally, a private membership is not favorable for families with low income. Moreover, as illustrated in the model, it might even reduce incentives to give birth for these families.

Finally, the paper shows some evidence that the various incentives to give birth in the private and statutory health insurance alter fertility in Germany. Nevertheless, this finding only presents a first step in understanding the interdependence between the dual health insurance system and population dynamics. To capture the impact of the different population dynamics, induced by the health insurance types and the selection of individuals into the PHI, on the health insurances adequately requires a general equilibrium framework. Such a full-fledged model is left for future research.

# References


Baudin, T. (2015). Religion and fertility: The French connection. *Demographic Research*, **32**, 397–420.

Breyer, F. (2001). Why funding is not a solution to the social security crisis. *IZA Discussion Paper, no. 328*.

Brunner, J. K. (1996). Transition from a pay-as-you-go to a fully funded pension system: The case of differing individuals and intragenerational fairness. *Journal of Public Economics*, **60** (1), 131–146.

Cameron, C. A. and Trivedi, P. K. (1998). *Regression Analysis of Count Data , Econometric Society Monogragh, no. 30*. Cambridge University Press.

Chromy, J. R. and Abeyasekera, S. (2005). Statistical analysis of survey data. *Household Sample Surveys in Developing and Transition Countries, Studies in Methods [text on the Internet]. New York: United Nations*.

Colombo, F. and Tapay, N. (2004). Private health insurance in OECD countries. *OECD Publishing*.

de la Croix, D. and Doepke, M. (2004). Public versus private education when differential fertility matters. *Journal of Development Economics*, **73** (2), 607–629.

Dräther, H. (2006). Zur bedeutung der familienversicherung. In K. Jacobs, J. Klauber and J. Leinert (eds.), *Fairer Wettbewerb oder Risikoselektion*, Analysen zur gesetzlichen und privaten Krankenversicherung. Bonn, pp. 49–76.

Fenge, R. and Meier, V. (2005). Pensions and fertility incentives. *Canadian Journal of Economics/Revue canadienne d'économique*, **38** (1), 28–48.

Fienberg, S. E. (2009). The relevance of irrelevance of weights for confidentiality and statistical analyses. *Journal of Privacy and Confidentiality*, **1** (2), 183–195.

Fox, J., Klüsener, S. and Myrskylä, M. (2015). Is a positive relationship between fertility and economic development emerging at the sub-national regional level? Theoretical considerations and evidence from Europe. *MPIDR Working Paper WP 2015-006*.

Freedman, D. S. (1963). The relation of economic status to fertility. *The American Economic Review*, **53** (3), 414–426.

— and Thornton, A. (1982). Income and fertility: The elusive relationship. *Demography*, **19** (1), 65–78.

Frejka, T. and Sobotka, T. (2008). Overview Chapter 1: Fertility in Europe: Diverse, delayed and below replacement. *Demographic Research*, **19** (3), 15–46.

Galloway, P. R., Lee, R. D. and Hammel, E. A. (1998). Infant mortality and the fertility transition: Macro evidence from Europe and new findings from Prussia. In M. R. Montgomery and B. Cohen (eds.), *From Death to Birth: Mortality Decline and Reproductive Change*, National Academy Press: Washington, DC, pp. 182–226.

Greene, W. H. *et al.* (1997). *FIML estimation of sample selection models for count data*. New York University, Leonard N. Stern School of Business.

Gress, S. (2007). Private health insurance in Germany: Consequences of a dual system. *Healthcare Policy*, **3** (2), 29.

Hagist, C., Klusen, N., Plate, A. and Raffelhüschen, B. (2005). Social health insurance – the major driver of unsustainable fiscal policy? *CESifo Working Paper Series*.

Hahn, M. H. and Haisken-DeNew, J. P. (2013). Panelwhiz and the australian longitudinal data infrastructure in economics. *Australian Economic Review*, **46** (3), 379–386.

Haisken-DeNew, J. P. and Hahn, M. H. (2010). Panelwhiz: Efficient data extraction of complex panel data sets – An example using the German SOEP. *Schmollers Jahrbuch*, **130** (4), 643–654.

Hank, K., Kreyenfeld, M. and Spiess, C. K. (2004). Kinderbetreuung und Fertilität in Deutschland/Child Care and Fertility in Germany. *Zeitschrift für Soziologie*, **33** (3), 228–244.

Heller, G. and Schnell, R. (2000). The Choir lnvisible: Zur Analyse der gesundheitsbezogenen Panelmortalität im Sozio-Ökonomischen Panel SOEP. In U. Helmert, K. Bammann, W. Vages and R. Müller (eds.), *Müssen Arme früher sterben? Soziale Ungleichheit und Gesundheit in Deutschland*, Weinheim: Juventa Verlag, pp. 115–134.

Hullegie, P. and Klein, T. J. (2010). The effect of private health insurance on medical care utilization and self-assessed health in Germany. *Health Economics*, **19** (9), 1048–1062.

Human Fertility Database (2016). Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at www.humanfertility.org (data downloaded 23.02.2016).

Janssen, C. and Frie, O., Kirstin Grosseand Ommen (2006). *Gesundheitliche Ungleichheit: Grundlagen, Probleme, Konzepte*, Wiesbaden: VS Verlag für Sozialwissenschaften, chap. Der Einfluss von sozialer Ungleichheit auf die medizinische und gesundheitsbezogene Versorgung in Deutschland, pp. 141–155.

Jones, L. E., Schoonbroodt, A. and Tertilt, M. (2010). Fertility theories: Can they explain the negative fertility-income relationship? In J. B. Shoven (ed.), *Demography and the Economy*, University of Chicago Press, pp. 43–199.

Kreyenfeld, M. (2010). Uncertainties in female employment careers and the postponement of parenthood in Germany. *European Sociological Review*, **26** (3), 351–366.

Lindo, J. M. (2010). Are children really inferior goods? Evidence from displacement-driven income shocks. *Journal of Human Resources*, **45** (2), 301–327.

Miranda, A. (2010). A double-hurdle count model for completed fertility data from the developing world.

Myrskylä, M. and Margolis, R. (2014). Happiness: Before and after the kids. *Demography*, **51** (5), 1843–1866.

Niehaus, F. (2009). Ein Vergleich der von Familien geleisteten Beiträge und erhaltenen Leistungen in der gesetzlichen Krankenversicherung. *Sozialer Fortschritt*, pp. 282–290.

OECD (2011). Coverage for health care. In *Health at a Glance*, OECD Publishing.

Rahmann, U. and Schupp, J. (2013). SOEP wave report 2012. *Berlin: German Socio-Economic Panel Study (SOEP), DIW Berlin*.

Rosenzweig, M. R. and Schultz, T. P. (1985). The demand for and supply of births: Fertility and its life cycle consequences. *The American Economic Review*, **75** (5), 992–1015.

Schnell, R. and Trappmann, M. (2006). Konsequenzen der Panelmortalität im SOEP für Schätzungen der Lebenserwartung. In F. Faulbaum and C. Wolf (eds.), *Stichprobenqualität in Bevölkerungsfragen*, *Sozialwissenschaftliche Tagungsberichte*, vol. 12, Bonn, pp. 139–158.

Schoumaker, B. (2013). A Stata module for computing fertility rates and TFRs from birth histories: tfr2. *Demographic Research*, **28**, 1093–1144.

Sinn, H.-W. (2000). Why a funded pension system is needed and why it is not needed. *International Tax and Public Finance*, **7** (4-5), 389–410.

StataCorp (2015). *Stata 14 Base Reference Manual*. College Station, TX: Stata Press.

Terza, J. V. (1998). Estimating count data models with endogenous switching: Sample selection and endogenous treatment effects. *Journal of Econometrics*, **84** (1), 129–154.

Van Groezen, B., Leers, T. and Meijdam, L. (2003). Social security and endogenous fertility: Pensions and child allowances as siamese twins. *Journal of Public Economics*, **87** (2), 233–251.

Varvarigos, D. and Zakaria, I. Z. (2013). Endogenous fertility in a growth model with public and private health expenditures. *Journal of Population Economics*, **26** (1), 67–85.

Verband der Privaten Krankenversicherung e.V. (2014). Erleichterte Aufnahme in die Private Krankenversicherung für Beamtenanfänger, gesetzlich versicherte Beamte und deren Angehörige – Öffnungsaktionen der Privaten Krankenversicherung.

Von Auer, L. and Büttner, B. (2004). Endogenous fertility, externalities, and efficiency in old-age pension systems. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, **160** (2), 294–310.

Wigger, B. U. (1999). Pay-as-you-go financed public pensions in a model of endogenous growth and fertility. *Journal of Population Economics*, **12** (4), 625–640.

Winegarden, C. R. and Murray, J. E. (2004). Effects of early health-insurance programs on European mortality and fertility trends. *Social Science & Medicine*, **58** (10), 1825–1836.

Winkelmann, R. (2013). *Econometric Analysis of Count Data*. Springer Science & Business Media.

Winship, C. and Radbill, L. (1994). Sampling weights and regression analysis. *Sociological Methods & Research*, **23** (2), 230–257.

# A Appendix

# B Proofs of the model

**Proof. Number of births**
The second row in Table 2 describes the optimal decision on the number of births of individual $i$ for each type of health insurance $j$. Optimal decisions on the number of births are a linear function in the unobserved exogenous non-labor income:

$$n\left(b_i, j\right) = n_{i,j}^0 + m_{i,j} b_i \tag{12}$$

$$\text{with} \quad n_{i,j}^0 = \begin{cases} \frac{\gamma(1-z)\omega_{i,j}}{\tau(1-z)\omega_{i,j}+a} & \text{if} \quad j = \text{SHI}_1 \\ \frac{\gamma[\omega_{i,j}-y]}{\tau\omega_{i,j}+a} & \text{if} \quad j = \text{SHI}_2 \\ \frac{\gamma[\omega_{i,j}-x_i]}{\tau\omega_{i,j}+x^k+a} & \text{if} \quad j = \text{PHI} \end{cases} \quad \text{and} \quad m_{i,j} = \begin{cases} \frac{\gamma}{\tau(1-z)\omega_{i,j}+a} & \text{if} \quad j = \text{SHI}_1 \\ \frac{\gamma}{\tau\omega_{i,j}+a} & \text{if} \quad j = \text{SHI}_2 \\ \frac{\gamma}{\tau\omega_{i,j}+x^k+a} & \text{if} \quad j = \text{PHI}. \end{cases}$$

The strictly positive parameters $a, H_i, h_i, w_i > 0$ as well as $h_i \leq H_i$ and $z, \tau \in \,]0, 1[$ directly imply that $m_{i,\text{SHI}_1} > m_{i,\text{SHI}_2} > m_{i,\text{PHI}}$.

**Case 1: SHI$_1$ versus PHI**

If $\left(1 - \tau n_{i,j}\right)\omega_{i,j} \leq \bar{\omega}$ individuals are either in the SHI$_1$ or in the PHI. Since $m_{i,\text{SHI}_1} > m_{i,\text{PHI}}$, a non-labor income $b_i > 0$ such that $n_{i,\text{PHI}} > n_{i,\text{SHI}_1}$ only exists iff $n_{i,\text{PHI}}^0 > n_{i,\text{SHI}_1}^0$. I denote the fertility differential as $\Psi \equiv n_{i,\text{PHI}} - n_{i,\text{SHI}_1}$. Rearranging with respect to $b_i = 0$ leads to the following threshold:

$$\Psi\,|_{b_i=0} \equiv n_{i,\text{PHI}}^0 - n_{i,\text{SHI}_1}^0 = 0 \Leftrightarrow w_i = \frac{x_i a}{H_i a - (1-z)\,h_i\left(\tau x_i + x^k + a\right)} \equiv \hat{w}_i,$$

with $a > \frac{(1-z)h_i\left(\tau x_i + x^k\right)}{H_i - (1-z)h_i}$ to ensure a positive denominator in $\hat{w}_i$. Then, if $w_i > \hat{w}_i$ , $n\left(b_i, \text{SHI}_1\right)$ and $n\left(b_i, \text{PHI}\right)$ have a strictly positive point of intersection, which is derived from the fertility differential by simple calculations:

$$\Psi = 0 \Leftrightarrow b_i = \frac{H_i w_i a - w_i h_i\left(1-z\right)\left(a + x^k + \tau x_i\right) - a x_i}{\tau w_i\left(H_i - \left(1-z\right)h_i\right) + x^k} \equiv \hat{b}_i^*.$$

Thereby, $\hat{b}_i^* > 0$ follows from the defined parameter setting as well as $w > \hat{w}_i$ .

**Case 2: $\text{SHI}_2$ versus PHI**

Following the argumentation of case 1, I define the fertility differential $\Phi \equiv n_{i,\text{PHI}} - n_{i,\text{SHI}_2}$ for $(1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega}$. Rearranging the fertility differential leads to the following threshold if $b_i = 0$:

$$\Phi\,|_{b_i=0} \equiv n^0_{i,\text{PHI}} - n^0_{i,\text{SHI}_2} = 0 \Leftrightarrow w_i = \frac{a\,(x_i - y) - yx^k}{H_i\,(\tau y + a) - h_i\,(\tau x_i + x^k + a)} \equiv \tilde{w}_i,$$

with $a > \frac{h_i\left(\tau x_i + x^k\right) - H_i y \tau}{H_i - h_i}$ to ensure a positive denominator. Then, if $w_i > \hat{w}_i$ , $n\,(b_i, \text{SHI}_2)$ and $n\,(b_i, \text{PHI})$ have a strictly positive point of intersection, which is derived from the fertility differential by simple calculations:

$$\Phi = 0 \Leftrightarrow b_i = \frac{H_i w_i\,(a + y\tau) - x_i\,(\tau h_i w_i + a) - (w_i h_i - y)\left(a + x^k\right)}{\tau w_i\,(H_i - h_i) + x^k} \equiv \tilde{b}^*_i.$$

Thereby, $\tilde{b}^*_i > 0$ follows from the defined parameter setting as well as $w > \tilde{w}_i$.

**Differential fertility**

Even if thresholds differ, case 1 and 2 behave identically, s.t. I define the following notation:

$$b^*_i = \begin{cases} \hat{b}^*_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{b}^*_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega} \end{cases} \qquad \text{and} \qquad w^*_i = \begin{cases} \hat{w}^*_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega} \\ \tilde{w}^*_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega}. \end{cases}$$

Finally, the fertility differentials and thresholds directly allow to conclude that:

1. ... if $w_i < w^*_i$, it follows that $b^*_i < 0$ and $b^*_i < b_i$, s.t. $n\,(b_i, \text{SHI}) > n\,(b_i, \text{PHI})\,,\ \forall b_i \geq 0$.
2. ... $w_i = w^*_i$ implies that $b^*_i = 0$. Hence, $n\,(b_i, \text{SHI}) = n\,(b_i, \text{PHI})$ iff $b_i = 0$ and $n\,(b_i, \text{SHI}) > n\,(b_i, \text{PHI})$, for all $b_i > 0$.
3. ... $w_i > w^*_i$ ensures that $b^*_i > 0$ and the following spacing of $b_i$ exists:

$$n\,(b_i, \text{PHI}) \begin{cases} > n\,(b_i, \text{SHI}) & \text{iff } b_i < b^*_i \\ = n\,(b_i, \text{SHI}) & \text{iff } b_i = b^*_i \\ < n\,(b_i, \text{SHI}) & \text{iff } b_i > b^*_i. \end{cases}$$

■

**Proof. Lemma 1: Health insurance choice**
Given the individual choice conditional to the type of health insurance, see Table 2, comparing indirect utilities yields the following thresholds:

**Case 1: $\text{SHI}_1$ versus PHI**

If $(1-\tau n_{i,j})\,\omega_{i,j} \le \bar{\omega}$, I define $\Delta_i \equiv U_{i,\text{PHI}} - U_{i,\text{SHI}_1}$ as the difference in indirect utilities. Individuals prefer the PHI if and only if $\Delta_i > 0$. Then, simple calculations lead to:

$$\Delta_i \equiv U_{i,\text{PHI}} - U_{i,\text{SHI}_1} \ge 0 \Leftrightarrow b_i \le \frac{1}{1-\rho_i}\left[w_i\left(\rho_i H_i - (1-z)\,h_i\right) - x_i\rho_i\right] \equiv \hat{b}_i^{**},$$

with $\rho_i \equiv \left[\frac{\tau h_i(1-z)w_i+a}{\tau H_i w_i + a + x^k}\right]^{\gamma}$. Rearranging $\hat{b}_i^{**}$ figures out that a threshold $\hat{b}_i^{**} \ge 0$ exits iff:

$$x_i \le \frac{1}{\rho_i} w_i\left(\rho_i H_i - (1-z)\,h_i\right) \equiv \hat{x}_i.$$

**Case 2: $\text{SHI}_2$ versus PHI**

If labor income is sufficiently high, $(1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega}$, I define $\omega_{i,j} \equiv U_{i,\text{PHI}} - U_{i,\text{SHI}_2}$ as the difference in indirect utilities. In this case, individuals prefer the PHI if and only if $\omega_{i,j} > 0$ and simple calculations yield:

$$\omega_{i,j} \equiv U_{i,\text{PHI}} - U_{i,\text{SHI}_2} \ge 0 \Leftrightarrow b_i \le \frac{1}{1-\lambda_i}\left[\left(\lambda_i H_i - h_i\right) w_i - \lambda_i x_i + y\right] \equiv \tilde{b}_i^{**},$$

with $\lambda_i \equiv \left[\frac{\tau h_i w_i + a}{\tau H_i w_i + a + x^k}\right]^{\gamma}$. Then $\tilde{b}_i^{**} \ge 0$ iff:

$$x_i \le \frac{1}{\lambda_i}\left(w_i\left(H_i\lambda_i - h_i\right) + y\right) \equiv \tilde{x}_i.$$

**Comparison of indirect utilities**

As the general spacing in both cases is identical, only the thresholds differ, I apply the following notation:

$$b_i^{**} = \begin{cases} \hat{b}_i^{**} & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \le \bar{\omega} \\ \tilde{b}_i^{**} & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega} \end{cases} \quad \text{and} \quad x_i^{*} = \begin{cases} \hat{x}_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} \le \bar{\omega} \\ \tilde{x}_i & \text{if} \quad (1-\tau n_{i,j})\,\omega_{i,j} > \bar{\omega}. \end{cases}$$

Then, $\Delta_i$ and $\omega_{i,j}$ and the thresholds $b_i^{**}$ and $x_i^{*}$ define the following cases:

1. ... if $x_i > x_i^{*}$, it follows that $b_i^{**} < 0$ and $b_i^{**} < b_i$, s.t. $U_{i,\text{SHI}} > U_{i,\text{PHI}},\ \forall b_i \ge 0$.
2. ... $x_i = x_i^{*}$ implies that $b_i^{**} = 0$. Hence, $U_{i,\text{SHI}} = U_{i,\text{PHI}}$ iff $b_i = 0$ and $U_{i,\text{SHI}} > U_{i,\text{PHI}}$ for all $b_i > 0$.

3. ... $x_i < x_i^*$ ensures that $b_i^{**} > 0$ and the following spacing of $b_i$ exists:

$$U_{i,\text{PHI}} \begin{cases} > U_{i,\text{SHI}} & \text{iff } b_i < b_i^{**} \\ = U_{i,\text{SHI}} & \text{iff } b_i = b_i^{**} \\ < U_{i,\text{SHI}} & \text{iff } b_i > b_i^{**}. \end{cases}$$

■

**Proof. Lemma 2**

**Case 1: SHI$_1$ versus PHI**

If $(1 - \tau n_{i,j})\,\omega_{i,j} \leq \bar{\omega}$, equalizing Eq. (6) and Eq. (9) leads to the threshold:

$$\hat{b}_i^* = \hat{b}_i^{**} \Leftrightarrow x_i = \hat{\hat{x}}_i \quad \text{with}$$

$$\hat{\hat{x}}_i \equiv \frac{w_i\left[(1-\rho_i)\left[(1-z)\,h_i\left(a+x^k\right) - H_i a\right] + \theta_i\left(\tau w_i\left(H_i - (1-z)\,h_i\right) + x^k\right)\right]}{\tau w_i \theta_i + \rho_i x^k - (1-\rho_i)\,a}.$$

and $\theta_i \equiv \rho_i H_i - (1-z)\,h_i$. Then, in case of $\tau w_i\left(H_i\rho_i - (1-z)\,h_i\right) + \rho_i x^k - (1-\rho_i)\,a > 0$:

$$\hat{b}_i^* \begin{cases} < \hat{b}_i^{**} & \text{iff} \;\; x_i < \hat{\hat{x}}_i \\ = \hat{b}_i^{**} & \text{iff} \;\; x_i = \hat{\hat{x}}_i \\ > \hat{b}_i^{**} & \text{iff} \;\; x_i > \hat{\hat{x}}_i. \end{cases}$$

Alternatively, if $\tau w_i\left(H_i\rho_i - (1-z)\,h_i\right) + \rho_i x^k - (1-\rho_i)\,a < 0$:

$$\hat{b}_i^* \begin{cases} < \hat{b}_i^{**} & \text{iff} \;\; x_i > \hat{\hat{x}}_i \\ = \hat{b}_i^{**} & \text{iff} \;\; x_i = \hat{\hat{x}}_i \\ > \hat{b}_i^{**} & \text{iff} \;\; x_i < \hat{\hat{x}}_i. \end{cases}$$

**Case 2: SHI$_2$ versus PHI**

If $(1 - \tau n_{i,j})\,\omega_{i,j} > \bar{\omega}$, comparing Eq. (7) and Eq. (10) leads to the threshold:

$$\tilde{b}_i^* = \tilde{b}_i^{**} \Leftrightarrow x_i = \tilde{\tilde{x}}_i \quad \text{with}$$

$$\tilde{\tilde{x}}_i \equiv \frac{\left(\tau w_i\left(H_i - h_i\right) + x^k\right)(\varrho + y) + (1-\lambda_i)\left((w_i h_i - y)\left(a + x^k\right) - w_i H_i\left(a + \tau y\right)\right)}{\tau\varrho + \lambda_i x^k - (1-\lambda_i)\,a}.$$

and $\varrho \equiv w_i\left(\lambda_i H_i - h_i\right)$. Then, in case of $\tau w_i\left(\lambda_i H_i - h_i\right) + \lambda_i x^k - (1-\lambda_i)\,a > 0$:

$$\tilde{b}_i^* \begin{cases} < \tilde{b}_i^{**} & \text{iff} \;\; x_i < \tilde{\tilde{x}}_i \\ = \tilde{b}_i^{**} & \text{iff} \;\; x_i = \tilde{\tilde{x}}_i \\ > \tilde{b}_i^{**} & \text{iff} \;\; x_i > \tilde{\tilde{x}}_i. \end{cases}$$

Alternatively, if $\tau w_i (\lambda_i H_i - h_i) + \lambda_i x^k - (1-\lambda_i) a < 0$:

$$\tilde{b}_i^* \begin{cases} < \tilde{b}_i^{**} & \text{iff} \quad x_i > \tilde{\tilde{x}}_i \\ = \tilde{b}_i^{**} & \text{iff} \quad x_i = \tilde{\tilde{x}}_i \\ > \tilde{b}_i^{**} & \text{iff} \quad x_i < \tilde{\tilde{x}}_i. \end{cases}$$

■

**Proof. Simultaneous choice on fertility and the type of health insurance**
Proposition 1 as well as Lemma 1 and 2 directly enable to conclude on the six cases in Proposition 2:

- If $b_i^* < b_i^{**}$, then:
  - 1a: $b_i^{**} \leq 0$, s.t. no $0 < b_i < b_i^*$ and $0 < b_i < b_i^{**}$ exists. However, since $0 = b_i = b_i^{**}$ is possible, it follows that $n_{i,\text{SHI}} > n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} \geq U_{i,\text{PHI}}$.
  - 1b: $b_i^* \leq 0 < b_i^{**}$ and hence, $b_i^* \leq b_i$ implies $n_{i,\text{SHI}} \geq n_{i,\text{PHI}}$ for all $b_i \geq 0$. Following Lemma 1, $0 \leq b_i \leq b_i^{**}$ implies $U_{i,\text{SHI}} \leq U_{i,\text{PHI}}$ and $b_i^{**} < b_i$ leads to $U_{i,\text{SHI}} > U_{i,\text{PHI}}$.
  - 1c: Since $b_i^*, b_i^{**} > 0$ and $b_i^* < b_i^{**}$, the 3 following spacing on $b_i$ exists:
    - If $0 \leq b_i \leq b_i^*$, $n_{i,\text{SHI}} \leq n_{i,\text{PHI}}$ according to $b_i \leq b_i^*$ (see Proposition 1) and $U_{i,\text{SHI}} < U_{i,\text{PHI}}$ follows from $b_i < b_i^{**}$ (see Lemma 1).
    - If $b_i^* < b_i \leq b_i^{**}$, then $n_{i,\text{SHI}} > n_{i,\text{PHI}}$ as $b_i > b_i^*$ and $U_{i,\text{SHI}} \leq U_{i,\text{PHI}}$ because of $b_i \leq b_i^{**}$.
    - If $b_i^{**} < b_i$, then $b_i^{**}, b_i^* < b_i$ implies $n_{i,\text{SHI}} > n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} > U_{i,\text{PHI}}$.
- If $b_i^* > b_i^{**}$, then:
  - 2a: $b_i^* \leq 0$, s.t. no $0 < b_i < b_i^*$ and $0 < b_i < b_i^{**}$ exists. However, since $0 = b_i = b_i^*$ is possible, it follows that $n_{i,\text{SHI}} \geq n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} > U_{i,\text{PHI}}$.
  - 2b: According to $b_i^{**} \leq 0 < b_i^*$, $b_i^{**} \leq 0$ implies $U_{i,\text{SHI}} \geq U_{i,\text{PHI}}$ for all $b_i \geq 0$. Following Proposition 1, $0 \leq b_i \leq b_i^*$ goes along with $n_{i,\text{SHI}} \leq n_{i,\text{PHI}}$ and $b_i^* < b_i$ with $n_{i,\text{SHI}} > n_{i,\text{PHI}}$.
  - 2c: $b_i^*, b_i^{**} > 0$ and $b_i^* > b_i^{**}$ such that:
    - If $0 \leq b_i \leq b_i^{**}$, then $b_i < b_i^*$ implies $n_{i,\text{SHI}} < n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} \leq U_{i,\text{PHI}}$ follows directly from $b_i \leq b_i^{**}$.
    - If $b_i^{**} < b_i \leq b_i^*$, Proposition 1 and Lemma 1 as well as $b_i \leq b_i^*$ and $b_i^{**} < b_i$ imply $n_{i,\text{SHI}} \leq n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} > U_{i,\text{PHI}}$, respectively.
    - If $b_i^* < b_i$, like in 1c, $b_i^{**}, b_i^* < b_i$ implies $n_{i,\text{SHI}} > n_{i,\text{PHI}}$ and $U_{i,\text{SHI}} > U_{i,\text{PHI}}$.

■

# C Estimation of TFRs

The strategy to calculate age-specific fertility rates and total fertility rates largely follows Schoumaker (2013). The number of births $y_i$ is Poisson distributed $y_i \sim P[\mu_i]$ with a mean $\mu_i = \lambda_i t_i$, decomposable into fertility rates $\lambda_i$ and exposures $t_i$. The estimation model then writes:

$$E(y_i|\mu_i,) = \exp[t_i + \beta_k A_{ki}],$$

with $A_{ki}$ as a set of dummy variables including the age groups. From estimations done with robust standard errors, it is straight forward to calculate ASFR. The fertility rate of a women in age group 20–24 e.g. writes:

$$\lambda_{20-24} = \exp[\beta_{20-24}]$$

per year and the TFR calculates as:

$$TFR = 2 \times \exp[\beta_{18-19}] + 5 \times \sum_{k=20-24}^{45-49} \exp[\beta_k], \tag{13}$$

whereat I apply sample splits to estimate TFRs by health insurance type or status. Afterwards, I use the delta method to calculate standard errors of age-specific fertility rates and the total fertility rate.

Table 13: TFRs by assumptions according to GSOEP

| | A0 without pw | | | A1 without pw | | | A1 with pw | | |
|---|---|---|---|---|---|---|---|---|---|
| | TFR | Confidence 95% | | TFR | Confidence 95% | | TFR | Confidence 95% | |
| ALL | 1.389 | 1.356 | 1.423 | 1.429 | 1.389 | 1.470 | 1.391 | 1.334 | 1.449 |
| $ALL_{since\ 1999}$ | 1.312 | 1.267 | 1.356 | 1.311 | 1.262 | 1.359 | 1.271 | 1.199 | 1.343 |
| $All_{Ins}$ | 1.338 | 1.291 | 1.385 | 1.338 | 1.287 | 1.388 | 1.275 | 1.203 | 1.348 |
| PHI | 1.326 | 1.168 | 1.484 | 1.325 | 1.157 | 1.492 | 1.191 | 0.959 | 1.424 |
| $PHI_{Pay}$ | 1.475 | 1.276 | 1.674 | 1.520 | 1.297 | 1.743 | 1.290 | 1.027 | 1.554 |
| $PHI_{Fam}$ | 0.742 | 0.411 | 1.073 | 0.693 | 0.355 | 1.032 | 0.731 | 0.193 | 1.268 |
| SHI | 1.336 | 1.287 | 1.385 | 1.335 | 1.282 | 1.387 | 1.277 | 1.201 | 1.352 |
| $SHI_{Man}$ | 1.354 | 1.289 | 1.418 | 1.355 | 1.286 | 1.424 | 1.233 | 1.139 | 1.326 |
| $SHI_{Vol}$ | 1.361 | 1.186 | 1.535 | 1.391 | 1.203 | 1.578 | 1.231 | 0.985 | 1.477 |
| $SHI_{Fam}$ | 1.408 | 1.296 | 1.520 | 1.405 | 1.283 | 1.528 | 1.472 | 1.286 | 1.657 |
| $SHI_{Stu}$ | 1.266 | 1.068 | 1.464 | 1.265 | 1.056 | 1.474 | 1.387 | 1.063 | 1.710 |

| | A2 without pw | | | A2 with pw | | |
|---|---|---|---|---|---|---|
| | TFR | Confidence 95% | | TFR | Confidence 95% | |
| ALL | 1.459 | 1.417 | 1.502 | 1.409 | 1.350 | 1.468 |
| $ALL_{since\ 1999}$ | 1.351 | 1.300 | 1.403 | 1.297 | 1.221 | 1.372 |
| $All_{Ins}$ | 1.351 | 1.300 | 1.403 | 1.299 | 1.223 | 1.374 |
| PHI | 1.361 | 1.188 | 1.534 | 1.213 | 0.972 | 1.454 |
| $PHI_{Pay}$ | 1.559 | 1.324 | 1.793 | 1.326 | 1.042 | 1.609 |
| $PHI_{Fam}$ | 0.846 | 0.463 | 1.229 | 0.831 | 0.288 | 1.374 |
| SHI | 1.347 | 1.293 | 1.401 | 1.300 | 1.221 | 1.380 |
| $SHI_{Man}$ | 1.397 | 1.325 | 1.469 | 1.298 | 1.197 | 1.399 |
| $SHI_{Vol}$ | 1.364 | 1.171 | 1.558 | 1.222 | 0.966 | 1.478 |
| $SHI_{Fam}$ | 1.351 | 1.229 | 1.472 | 1.384 | 1.207 | 1.562 |
| $SHI_{Stu}$ | 1.205 | 0.995 | 1.415 | 1.342 | 0.997 | 1.686 |

Total fertility rates in private health insurance (PHI), as self paying member ($PHI_{Pay}$) or covered by a family member ($PHI_{Fam}$), and in statutory health insurance (SHI), distinguished by Mandatory ($SHI_{Man}$), Voluntary ($SHI_{Vol}$) and members insured by a family member ($SHI_{Fam}$). $SHI_{Stu}$ includes students, pensioners and so on. $All_{Ins}$ captures TFR after excluding individuals with incomplete information on health insurances. Confidence intervals and TFRs are calculated using robust standard errors. Source: GSOEP; own calculations with and without probability weights (pw).

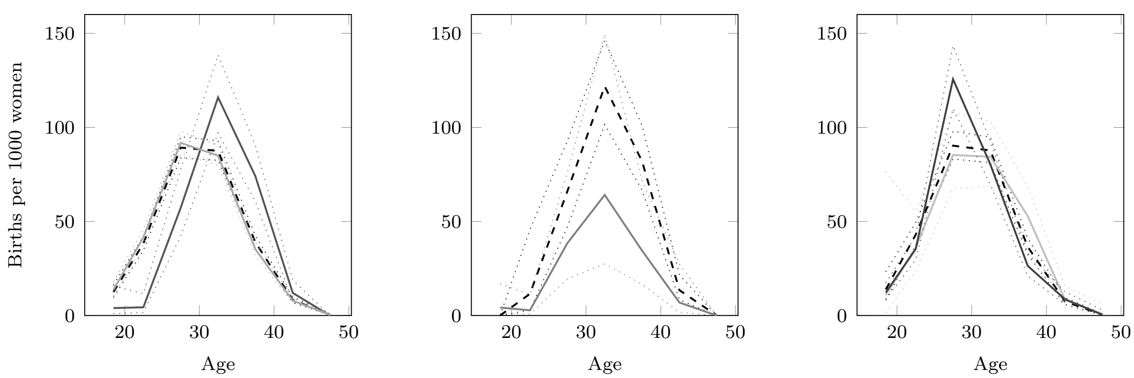



Figure 8: Age-specific fertility rates by health insurance status without pw

Left Panel: ASFR overall (dashed black), in PHI (dark gray) and SHI (medium gray). Middle Panel: ASFR in PHI distinguished by self paying members (dashed black) and women covered by family members (medium gray). Right Panel: ASFR in SHI, distinguished by mandatory (dashed black) and voluntary members (light gray) as well as those insured by a family member (solid dark gray). Dotted lines mark 95% confidence intervals. Source: GSOEP; own calculations without probability weights.

# D Variables and missings

The high number of missings might alter findings. This appendix presents some details on the number of missings, the distribution and relevant definitions of variables considered in the estimations. Taking only into account women age 18–49 with information on the type of insurance in the estimation of total fertility rates does neither change the distribution of age groups nor of health insurance types, see columns "All" and "Estimation TFR" in Table 14. The distribution of women across health insurance types does not change either.

In the count data and logistic models, I apply several covariates. In particular the high share of missing values in the variable previous relative income shrinks the number of observations in the estimated Models 1 and 2, see Table 15. It relates the monthly gross labor income in the previous year to the SSC in the previous year. The missing observations predominately reduce the share of individuals in younger age groups. Simultaneously, the lower share of young individuals effects the distribution of women in fertile age over educational classes following the International Standard Classification of Education (ISCED). The fraction of individuals in school shrinks. As the same is observable for inadequate education, see Table 14, I combine both in the class "Inadequately". The lower share of young women/women in education decreases the share of family members and students in the SHI. A similar situation is observable in the PHI for family members. Missing values do not affect the distribution of remaining variables remarkably. Including only observations with information on the partner strongly changes the distribution of the marital status of women, see Table 14 columns Model 3 and 4. Obviously, the share of singles, divorced and individuals living in separated married couples decreases.

Due to a very limited number of observations in some categories of the factor variables, I do the following reclassifications: I combine low- and middle level civil servants into the class "low-/middle-level civil servants". Indirect migration background also captures those women with not differentiable migration background. Furthermore, the class "4+ children" includes all households with at least four children in age 0–14 living in the household in the previous year. Finally, Table 14 reveals a very low number of women living in registered Partnerships. This women are included in the class "married and living together".

Table 14: Missings and distribution of observations across categorial variables

| | All | | Estim. TFR | | Model 1 and 2 | | Model 3 and 4 | | Model 1 and 2 | | Model 3 and 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent var. | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % |
| **Age groups** | 87052 | | 80318 | | 38760 | | 20885 | | 38683 | | 20.784 | |
| 18–19 | 4792 | 5.50 | 4304 | 5.36 | 496 | 1.28 | 6 | 0.03 | 496 | 1.28 | 6 | 0.03 |
| 20–24 | 11544 | 13.26 | 10153 | 12.64 | 3556 | 9.17 | 482 | 2.31 | 3550 | 9.18 | 481 | 2.31 |
| 25–29 | 11210 | 12.88 | 10163 | 12.65 | 4591 | 11.84 | 1634 | 7.82 | 4586 | 11.86 | 1629 | 7.84 |
| 30–34 | 12740 | 14.63 | 11778 | 14.66 | 5613 | 14.48 | 3125 | 14.96 | 5600 | 14.48 | 3104 | 14.93 |
| 35–39 | 14843 | 17.05 | 13841 | 17.23 | 6909 | 17.83 | 4355 | 20.85 | 6891 | 17.81 | 4334 | 20.85 |
| 40–44 | 16249 | 18.67 | 15286 | 19.03 | 8742 | 22.55 | 5671 | 27.15 | 8728 | 22.56 | 5646 | 27.17 |
| 45–49 | 15674 | 18.01 | 14793 | 18.42 | 8853 | 22.84 | 5612 | 26.87 | 8832 | 22.83 | 5584 | 26.87 |
| **Insurance** | 80400 | | 80318 | | 38760 | | 20885 | | 38683 | | 20784 | |
| SHI | 72533 | 90.22 | 72533 | 91.31 | 34918 | 90.09 | 18652 | 89.31 | 34898 | 90.22 | 18590 | 89.44 |
| PHI | 7785 | 9.68 | 7785 | 9.69 | 3842 | 9.91 | 2233 | 10.69 | 3785 | 9.78 | 2194 | 10.56 |
| No insurance | 82 | 0.10 | – | – | – | – | – | – | – | – | – | – |
| **Part.'s insurance** | 48804 | | 48489 | | 25107 | | 20885 | | 25066 | | 20784 | |
| SHI | 39811 | 81.57 | 39722 | 81.92 | 19869 | 79.14 | 16395 | 78.50 | 19849 | 79.19 | 16371 | 78.77 |
| PHI | 8787 | 18.00 | 8767 | 18.08 | 5238 | 20.86 | 4490 | 21.50 | 5217 | 20.81 | 4413 | 21.23 |
| No insurance | 296 | 0.42 | – | – | – | – | – | – | – | – | – | – |
| **Insurance status** | 80103 | | 80100 | | 38683 | | 20851 | | 38683 | | 20784 | |
| $\text{SHI}_{\text{Man}}$ | 43499 | 54.30 | 43499 | 54.31 | 26745 | 69.14 | 14123 | 67.73 | 26745 | 69.14 | 14073 | 67.71 |
| $\text{SHI}_{\text{Vol}}$ | 5959 | 7.44 | 5959 | 7.44 | 3368 | 8.71 | 1709 | 8.20 | 3368 | 8.71 | 1703 | 8.19 |
| $\text{SHI}_{\text{Fam}}$ | 18315 | 22.86 | 18315 | 22.87 | 3828 | 9.90 | 2565 | 12.30 | 3828 | 9.90 | 2565 | 12.34 |
| $\text{SHI}_{\text{Stu}}$ | 4699 | 5.87 | 4699 | 5.87 | 957 | 2.47 | 249 | 1.19 | 957 | 2.47 | 249 | 1.20 |
| $\text{PHI}_{\text{Fam}}$ | 2325 | 2.90 | 2324 | 2.90 | 504 | 1.30 | 255 | 1.22 | 504 | 1.30 | 252 | 1.21 |
| $\text{PHI}_{\text{Pay}}$ | 5306 | 6.62 | 5304 | 6.62 | 3281 | 8.48 | 1950 | 9.35 | 3281 | 8.48 | 1942 | 9.34 |
| **Part.'s ins. status** | 48521 | | 48310 | | 25012 | | 20814 | | 24976 | | 20784 | |
| $\text{SHI}_{\text{Man}}$ | 28851 | 59.58 | 28785 | 59.58 | 14559 | 58.21 | 12521 | 60.16 | 14545 | 58.24 | 12509 | 60.19 |
| $\text{SHI}_{\text{Vol}}$ | 7763 | 16.03 | 7747 | 16.04 | 3921 | 15.68 | 3441 | 16.53 | 3916 | 15.68 | 3438 | 16.54 |
| $\text{SHI}_{\text{Fam}}$ | 858 | 1.77 | 855 | 1.77 | 457 | 1.83 | 141 | 0.68 | 457 | 1.83 | 141 | 0.68 |
| $\text{SHI}_{\text{Stu}}$ | 2305 | 4.76 | 2301 | 4.76 | 917 | 3.67 | 283 | 1.36 | 917 | 3.67 | 283 | 1.36 |
| $\text{PHI}_{\text{Fam}}$ | 196 | 0.40 | 195 | 0.40 | 106 | 0.42 | 74 | 0.36 | 106 | 0.42 | 74 | 0.36 |
| $\text{PHI}_{\text{Pay}}$ | 8448 | 17.45 | 8427 | 17.44 | 5052 | 20.20 | 4354 | 20.92 | 5035 | 20.16 | 4339 | 20.88 |
| **Marital status** | 80595 | | 80299 | | 38760 | | 20885 | | 38683 | | 20784 | |
| Married | 43059 | 53.43 | 42940 | 53.48 | 21671 | 55.91 | 17271 | 82.70 | 21634 | 55.93 | 17188 | 82.70 |
| Married, sep. | 1844 | 2.29 | 1831 | 2.28 | 912 | 2.35 | 61 | 0.29 | 908 | 2.35 | 60 | 0.29 |
| Single | 28810 | 35.75 | 28683 | 35.72 | 12450 | 32.12 | 2718 | 13.01 | 12424 | 32.12 | 2704 | 13.01 |
| Divorced | 6234 | 7.73 | 6197 | 7.72 | 3381 | 8.72 | 782 | 3.74 | 3371 | 8.71 | 779 | 3.75 |
| Widowed | 630 | 0.78 | 630 | 0.78 | 338 | 0.87 | 48 | 0.23 | 338 | 0.87 | 48 | 0.23 |
| Reg. Partnership | 18 | 0.02 | 18 | 0.02 | 8 | 0.02 | 5 | 0.02 | 8 | 0.02 | 5 | 0.02 |
| **HH-mem. 0–14** | 78611 | | 72297 | | 38760 | | 20885 | | 38683 | | 20784 | |
| 0 children | 41115 | 52.30 | 37494 | 51.86 | 22965 | 59.25 | 10469 | 50.13 | 22913 | 59.23 | 10451 | 50.11 |
| 1 child | 19711 | 25.07 | 18289 | 25.30 | 9314 | 24.03 | 5665 | 27.12 | 9298 | 24.04 | 5643 | 27.15 |
| 2 children | 12705 | 16.16 | 11847 | 16.39 | 5441 | 14.04 | 3990 | 19.10 | 5436 | 14.05 | 3973 | 19.12 |
| 3 children | 2951 | 3.75 | 2741 | 3.79 | 876 | 2.26 | 653 | 3.13 | 872 | 2.25 | 645 | 3.10 |
| 4+ children | 2129 | 2.71 | 1926 | 2.66 | 164 | 0.42 | 108 | 0.52 | 164 | 0.42 | 108 | 0.52 |
| **Migr. backgr.** | 86882 | | 80213 | | 38760 | | 20885 | | 38683 | | 20784 | |
| no | 68810 | 79.20 | 63701 | 79.41 | 32009 | 82.58 | 17410 | 83.36 | 31938 | 82.56 | 17323 | 83.35 |
| direct. | 10753 | 12.38 | 9860 | 12.29 | 3917 | 10.11 | 2300 | 11.01 | 3915 | 10.12 | 2290 | 11.02 |
| indirect | 7319 | 8.42 | 6652 | 8.29 | 2834 | 7.31 | 1175 | 5.63 | 2830 | 7.32 | 1171 | 5.63 |
| **West/East Ger.** | 87062 | | 80318 | | 38760 | | 20885 | | 38683 | | 20784 | |
| East Germany | 19639 | 22.56 | 18428 | 22.94 | 9384 | 24.21 | 5171 | 24.76 | 9368 | 24.22 | 5143 | 24.74 |
| West Germany | 67413 | 77.44 | 61890 | 77.06 | 29376 | 75.79 | 15714 | 75.24 | 29316 | 75.78 | 15641 | 75.26 |
| **Education** | 78348 | | 78072 | | 38760 | | 20885 | | 38683 | | 20784 | |
| In school | 2286 | 2.92 | 2274 | 2.91 | 104 | 0.27 | 1 | 0.00 | 104 | 0.27 | 1 | 0.00 |
| Inadequately | 1380 | 1.76 | 1375 | 1.76 | 359 | 0.93 | 143 | 0.68 | 357 | 0.92 | 142 | 0.68 |
| General elementary | 10882 | 13.89 | 10821 | 13.86 | 4227 | 10.91 | 1957 | 9.37 | 4220 | 10.91 | 1951 | 9.39 |
| Middle vocational | 37574 | 47.96 | 37464 | 47.99 | 18557 | 47.93 | 9957 | 47.68 | 18555 | 47.97 | 9915 | 47.70 |
| Vocational plus Abi | 6878 | 8.78 | 6855 | 8.78 | 3830 | 9.88 | 2052 | 9.83 | 3828 | 9.90 | 2047 | 9.85 |
| Higher Vocational | 5250 | 6.70 | 5231 | 6.70 | 3049 | 7.87 | 1806 | 8.65 | 3043 | 7.87 | 1797 | 8.65 |
| Higher Education | 14098 | 17.99 | 14052 | 18.00 | 8614 | 22.22 | 4969 | 23.79 | 8576 | 22.17 | 4931 | 23.72 |
| **Part.'s education** | 48458 | | 48316 | | 25119 | | 20885 | | 25076 | | 20784 | |
| In school | 20 | 0.04 | 20 | 0.04 | 5 | 0.02 | 1 | 0.00 | 5 | 0.02 | 1 | 0.00 |
| Inadequately | 725 | 1.50 | 724 | 1.50 | 266 | 1.06 | 165 | 0.79 | 266 | 1.06 | 165 | 0.79 |
| General elementary | 4359 | 9.00 | 4336 | 8.97 | 1979 | 7.88 | 1551 | 7.43 | 1978 | 7.89 | 1540 | 7.41 |
| Middle vocational | 23625 | 48.75 | 23564 | 48.77 | 12214 | 48.62 | 9961 | 47.69 | 12204 | 48.67 | 9928 | 47.77 |
| Vocational plus Abi | 2858 | 5.90 | 2853 | 5.90 | 1483 | 5.90 | 1250 | 5.99 | 1480 | 5.90 | 1247 | 6.00 |
| Higher Vocational | 5118 | 10.56 | 5105 | 10.57 | 2776 | 11.05 | 2359 | 11.30 | 2772 | 11.05 | 2344 | 11.28 |
| Higher Education | 11753 | 24.25 | 11714 | 24.24 | 6396 | 25.46 | 5598 | 26.80 | 6371 | 25.41 | 5559 | 26.75 |

Continuation of Table 14

| | All | | Estim. TFR | | Model 1 and 2 | | Model 3 and 4 | | Model 1 and 2 | | Model 3 and 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent var. | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % | Freq. | in % |
| **Civil servant** | 80605 | | 80308 | | 38760 | | 20885 | | 39683 | | 20784 | |
| No civil servant | 77642 | 96.32 | 77382 | 96.36 | 36780 | 94.89 | 19748 | 94.56 | 36742 | 94.98 | 19665 | 94.62 |
| Low-/middle-level | 851 | 1.06 | 831 | 1.03 | 571 | 1.47 | 308 | 1.47 | 560 | 1.45 | 305 | 1.47 |
| High-level | 1512 | 1.88 | 1498 | 1.87 | 1008 | 2.60 | 577 | 2.76 | 986 | 2.55 | 565 | 2.72 |
| Executive | 600 | 0.74 | 597 | 0.74 | 401 | 1.03 | 252 | 1.21 | 395 | 1.02 | 249 | 1.20 |
| **Part. civil serv.** | 49055 | | 48909 | | 25308 | | 20885 | | 25263 | | 20784 | |
| No civil servant | 45670 | 93.10 | 45553 | 93.14 | 23449 | 92.65 | 19294 | 92.38 | 23415 | 92.68 | 19231 | 92.53 |
| Low-/middle-level | 1226 | 2.50 | 1214 | 2.48 | 673 | 2.66 | 538 | 2.58 | 671 | 2.66 | 513 | 2.47 |
| High-level | 1349 | 2.75 | 1336 | 2.73 | 755 | 2.98 | 663 | 3.17 | 751 | 2.97 | 653 | 3.14 |
| Executive | 810 | 1.65 | 806 | 1.65 | 431 | 1.70 | 390 | 1.87 | 426 | 1.69 | 387 | 1.86 |
| **Health t-1** | 74575 | | 69.560 | | 38760 | | 20885 | | 38683 | | 20784 | |
| Very good | 10255 | 13.75 | 9510 | 13.67 | 4913 | 12.68 | 2245 | 10.75 | 4897 | 12.66 | 2230 | 10.73 |
| Good | 37427 | 50.19 | 35014 | 50.31 | 19770 | 51.01 | 10946 | 52.41 | 19740 | 51.03 | 10897 | 52.34 |
| Satisfactory | 19712 | 26.43 | 18368 | 26.39 | 10716 | 27.65 | 6016 | 28.81 | 10690 | 27.63 | 5986 | 28.80 |
| Poor | 6191 | 8.30 | 5782 | 8.31 | 3038 | 7.84 | 1539 | 7.37 | 3034 | 7.84 | 1532 | 7.37 |
| Bad | 990 | 1.33 | 916 | 1.32 | 323 | 0.83 | 139 | 0.67 | 322 | 0.83 | 139 | 0.67 |
| **Part.'s health t-1** | 43397 | | 43280 | | 24663 | | 20885 | | 24621 | | 20784 | |
| Very good | 4635 | 10.68 | 4616 | 10.67 | 2439 | 9.89 | 2089 | 10.00 | 2429 | 9.87 | 2078 | 10.00 |
| Good | 21928 | 50.53 | 21874 | 50.54 | 12330 | 49.99 | 10739 | 51.42 | 12312 | 50.01 | 10685 | 51.41 |
| Satisfactory | 12587 | 29.00 | 12553 | 29.00 | 7442 | 30.17 | 6305 | 30.19 | 7430 | 30.18 | 6273 | 30.18 |
| Poor | 3571 | 8.23 | 3561 | 8.23 | 2061 | 8.36 | 1563 | 7.48 | 2059 | 8.36 | 1560 | 7.51 |
| Bad | 676 | 1.56 | 676 | 1.56 | 391 | 1.59 | 189 | 0.90 | 391 | 1.59 | 188 | 0.90 |

Source: GSOEP; own calculations.

Table 15: Summary statistics: reative income

| | | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|---|
| Previous relative income | | | | | | |
| All | | 42102 | 0.5377 | 0.4748 | 0 | 29.6293 |
| Estim. TFR | | 39492 | 0.5390 | 0.4719 | 0 | 29.6293 |
| By type of | Model 1 and 2 | 38760 | 0.5426 | 0.4657 | 0 | 29.6293 |
| insurance | Model 3 and 4 | 20885 | 0.5454 | 0.4455 | 0 | 8.4904 |
| By insurance | Model 1 and 2 | 38683 | 0.5422 | 0.4652 | 0 | 29.6293 |
| status | Model 3 and 4 | 20784 | 0.5449 | 0.4447 | 0 | 8.4904 |
| Previous relative income of the partner | | | | | | |
| All | | 32981 | 1.0610 | 0.7656 | 0 | 29.62933 |
| Estim. TFR | | 32908 | 1.0610 | 0.7656 | 0 | 29.62933 |
| By type of | Model 1 and 2 | 21372 | 1.0410 | 0.7627 | 0 | 29.6293 |
| insurance | Model 3 and 4 | 20885 | 1.0425 | 0.7657 | 0 | 29.6293 |
| By insurance | Model 1 and 2 | 21332 | 1.0405 | 0.7619 | 0 | 29.62933 |
| status | Model 3 and 4 | 20784 | 1.0416 | 0.7648 | 0 | 29.62933 |

Source: GSOEP; own calculations.

# E Tables

## E.1 Poisson distribution in the sample with information on health insurance status

Table 16: Events and exposures to risk since 1999 in the sample with health insurance status

| | Observations | | | Poisson | Observations | | | Poisson |
|---|---|---|---|---|---|---|---|---|
| | SHI | PHI | Total | Total | SHI | PHI | Total | Total |
| Persons | 7786 | 1030 | 8455 | | 4609 | 643 | 5081 | |
| Person-years | 34898 | 3785 | 38683 | | 18590 | 2194 | 20784 | |
| Events* | | | | | | | | |
| 0 | 33725 | 3633 | 37358 | 37359.2 | 17893 | 2088 | 19981 | 19980.9 |
| 1 | 1157 | 146 | 1303 | 1300.9 | 685 | 102 | 787 | 787.4 |
| 2 | 16 | 6 | 22 | 22.9 | 12 | 4 | 16 | 15.7 |
| 3+ | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0.2 |
| No. of Birth: | 1189 | 158 | 1347 | 1346.0 | 709 | 110 | 819 | 819.0 |
| p-value** | – | – | 0.9802 | | – | – | 0.9974 | |

* Events per observation, each observation implies one person-year.

** p-value from Chi-square test with H0: observations are Poisson distribution.

Source: GSOEP; own calculations.

To apply count data models for the health insurance status instead of the health insurance type, I compare the observed distribution with the Poisson distribution. Table 16 adds the Poisson distribution of events for the observed mean. Both the observed and Poisson distribution look quite similar. Furhtermore, the null-hypothesis of the Chi-square test that observations are Poisson distributed is not rejected.

## E.2 Estimation outputs for count data and logistic models

Factor and dummy variables in Tables 17 to 34 have the following reference categories: age groups: age 20–24; PHI: SHI; marital status: married and living together; HH-members age 0–14 in $t-1$: no children; migration background: no migration background; West Germany: East Germany; education: general elementary; previous health status: very good health; health insurance status: paying member in PHI; brothers or sisters: none; states: Berlin. In all tables $t$ statistics are in parentheses, confidence levels are * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Datasource is GSOEP.

Table 17: Effect of the PHI on fertility in ET-models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.219** | (2.13) | 0.230* | (1.83) | 0.255** | (2.07) | 0.435** | (2.47) |
| **Partner in PHI** | | | | | 0.0291 | (0.33) | -0.0454 | (-0.42) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.383 | (-1.01) | -0.351 | (-0.93) | 1.828*** | (2.91) | 1.834*** | (2.86) |
| 25–29 | 0.514*** | (4.72) | 0.494*** | (4.52) | 0.195 | (1.17) | 0.183 | (1.10) |
| 30–34 | 0.281** | (2.41) | 0.232** | (1.96) | -0.119 | (-0.70) | -0.134 | (-0.77) |
| 35–39 | -0.671*** | (-5.10) | -0.725*** | (-5.43) | -1.076*** | (-5.75) | -1.084*** | (-5.70) |
| 40–44 | -2.587*** | (-15.03) | -2.636*** | (-15.20) | -3.009*** | (-13.02) | -3.002*** | (-12.86) |
| 45–49 | -6.127*** | (-8.62) | -6.180*** | (-8.67) | -6.817*** | (-6.74) | -6.799*** | (-6.72) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.333* | (-1.73) | -0.329* | (-1.72) | -0.403 | (-0.62) | -0.396 | (-0.62) |
| Single | -1.318*** | (-17.59) | -1.311*** | (-17.54) | -0.792*** | (-8.02) | -0.793*** | (-7.98) |
| Divorced | -0.370*** | (-2.83) | -0.384*** | (-2.93) | -0.160 | (-0.70) | -0.165 | (-0.72) |
| Widowed | -0.0594 | (-0.11) | -0.0949 | (-0.17) | -18.18*** | (-55.32) | -15.36*** | (-46.07) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0692 | (-0.98) | -0.0420 | (-0.59) | -0.0772 | (-0.87) | -0.0613 | (-0.68) |
| 2 children | -0.938*** | (-8.43) | -0.891*** | (-7.90) | -1.005*** | (-7.46) | -0.983*** | (-7.18) |
| 3 children | -0.975*** | (-4.05) | -0.933*** | (-3.87) | -1.096*** | (-3.69) | -1.091*** | (-3.65) |
| 4+ children | 0.106 | (0.31) | 0.128 | (0.37) | 0.0503 | (0.11) | 0.0614 | (0.13) |
| **Migration background** | | | | | | | | |
| Direct | 0.0930 | (1.10) | 0.106 | (1.25) | 0.0204 | (0.19) | 0.0184 | (0.17) |
| Indirect | 0.0185 | (0.19) | 0.0163 | (0.17) | 0.146 | (1.18) | 0.141 | (1.13) |
| **West Germany** | -0.164** | (-2.51) | -0.165** | (-2.51) | 0.0542 | (0.63) | 0.0760 | (0.86) |
| **Education** | | | | | | | | |
| Inadequately | -0.0956 | (-0.28) | -0.108 | (-0.32) | -0.0582 | (-0.10) | -0.0344 | (-0.06) |
| Middle vocational | 0.179* | (1.73) | 0.182* | (1.75) | 0.129 | (0.96) | 0.137 | (1.01) |
| Vocational plus Abi | 0.186 | (1.51) | 0.180 | (1.46) | 0.133 | (0.85) | 0.132 | (0.83) |
| Higher vocational | 0.344*** | (2.67) | 0.341*** | (2.65) | 0.196 | (1.20) | 0.201 | (1.22) |
| Higher education | 0.513*** | (4.56) | 0.508*** | (4.48) | 0.457*** | (3.18) | 0.468*** | (3.18) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.162 | (-0.40) | -0.123 | (-0.30) |
| Middle vocational | | | | | -0.0325 | (-0.23) | -0.00474 | (-0.03) |
| Vocational plus Abi | | | | | 0.236 | (1.41) | 0.257 | (1.51) |
| Higher vocational | | | | | 0.220 | (1.33) | 0.244 | (1.46) |
| Higher education | | | | | 0.243* | (1.65) | 0.276* | (1.81) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0462 | (0.21) | | | -0.161 | (-0.51) |
| High-level | | | -0.157 | (-0.82) | | | -0.296 | (-1.26) |
| Executive | | | 0.0151 | (0.06) | | | -0.287 | (-0.96) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.199 | (0.83) |
| High-level | | | | | | | 0.181 | (0.96) |
| Executive | | | | | | | 0.0890 | (0.31) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0944 | (1.21) | | | 0.0950 | (0.95) |
| Satisfactory | | | 0.0420 | (0.47) | | | 0.0134 | (0.11) |
| Poor | | | 0.290** | (2.43) | | | 0.0308 | (0.18) |
| Bad | | | 0.139 | (0.39) | | | -0.697 | (-0.99) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0590 | (0.60) |
| Satisfactory | | | | | | | -0.0945 | (-0.81) |
| Poor | | | | | | | -0.244 | (-1.29) |
| Bad | | | | | | | 0.228 | (0.52) |
| **Rel. income in t-1** | | | 0.136** | (2.56) | | | 0.0539 | (0.69) |
| **Partner's rel. income in t-1** | | | | | | | -0.0353 | (-0.60) |
| Constant | -2.288*** | (-14.84) | -2.423*** | (-14.26) | -2.144*** | (-8.92) | -2.247*** | (-8.16) |

Continuation of Table 17

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.0982 | (0.88) | 0.0982 | (0.87) | -7.018*** | (-38.02) | -2.436*** | (-12.14) |
| 25–29 | -0.124** | (-2.28) | -0.124** | (-2.28) | 0.0965 | (0.52) | 0.0971 | (0.52) |
| 30–34 | -0.157*** | (-3.01) | -0.157*** | (-3.01) | 0.166 | (0.93) | 0.168 | (0.94) |
| 35–39 | -0.0686 | (-1.32) | -0.0686 | (-1.32) | 0.251 | (1.41) | 0.253 | (1.43) |
| 40–44 | -0.0489 | (-0.94) | -0.0489 | (-0.94) | 0.248 | (1.40) | 0.251 | (1.42) |
| 45–49 | 0.0738 | (1.41) | 0.0738 | (1.41) | 0.336* | (1.90) | 0.338* | (1.91) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.259*** | (-3.40) | -0.259*** | (-3.40) | -0.216 | (-0.86) | -0.217 | (-0.86) |
| Single | -0.00299 | (-0.10) | -0.00298 | (-0.10) | -0.0628 | (-1.15) | -0.0623 | (-1.14) |
| Divorced | -0.221*** | (-5.21) | -0.221*** | (-5.21) | -0.162 | (-1.62) | -0.163 | (-1.63) |
| Widowed | -0.143 | (-1.29) | -0.143 | (-1.29) | 0.0724 | (0.17) | 0.0724 | (0.17) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.127*** | (4.58) | 0.127*** | (4.58) | 0.171*** | (4.29) | 0.171*** | (4.27) |
| 2 children | 0.191*** | (5.39) | 0.191*** | (5.39) | 0.196*** | (4.17) | 0.196*** | (4.16) |
| 3 children | 0.249*** | (3.31) | 0.249*** | (3.31) | 0.198** | (1.99) | 0.197** | (1.99) |
| 4+ children | -0.163 | (-0.53) | -0.163 | (-0.53) | -2.192*** | (-3.71) | -2.189*** | (-3.70) |
| **Migration background** | | | | | | | | |
| Direct | -0.341*** | (-7.79) | -0.341*** | (-7.79) | -0.184*** | (-3.13) | -0.184*** | (-3.12) |
| Indirect | -0.218*** | (-4.87) | -0.218*** | (-4.87) | -0.170** | (-2.26) | -0.170** | (-2.26) |
| **West Germany** | 0.228*** | (8.29) | 0.228*** | (8.29) | 0.199*** | (4.89) | 0.199*** | (4.90) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.859*** | (39.49) | 2.859*** | (39.49) | 3.008*** | (27.00) | 3.008*** | (26.99) |
| High-level | 2.997*** | (47.47) | 2.997*** | (47.47) | 2.961*** | (29.67) | 2.961*** | (29.69) |
| Executive | 3.033*** | (29.01) | 3.033*** | (29.01) | 3.069*** | (16.65) | 3.067*** | (16.66) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.152* | (-1.71) | -0.152* | (-1.71) |
| High-level | | | | | 0.0860 | (1.14) | 0.0856 | (1.13) |
| Executive | | | | | 0.120 | (1.07) | 0.120 | (1.07) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.0994*** | (-3.07) | -0.0994*** | (-3.07) | 0.0234 | (0.46) | 0.0237 | (0.47) |
| Satisfactory | -0.201*** | (-5.56) | -0.201*** | (-5.56) | -0.0786 | (-1.42) | -0.0783 | (-1.41) |
| Poor | -0.269*** | (-5.26) | -0.269*** | (-5.26) | -0.240*** | (-2.91) | -0.240*** | (-2.91) |
| Bad | -0.457*** | (-3.26) | -0.457*** | (-3.26) | -0.491* | (-1.88) | -0.488* | (-1.87) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | 0.00556 | (0.10) | 0.00511 | (0.09) |
| Satisfactory | | | | | -0.0226 | (-0.38) | -0.0233 | (-0.39) |
| Poor | | | | | -0.00546 | (-0.07) | -0.00597 | (-0.08) |
| Bad | | | | | -0.359 | (-1.47) | -0.360 | (-1.48) |
| **Rel. income in t-1** | 0.667*** | (25.62) | 0.667*** | (25.63) | 0.712*** | (20.30) | 0.712*** | (20.30) |
| **Partner's rel. income in t-1** | | | | | -0.00214 | (-0.11) | -0.00218 | (-0.12) |
| **Partner in PHI** | | | | | 1.061*** | (29.54) | 1.061*** | (29.54) |
| Constant | -2.031*** | (-33.42) | -2.031*** | (-33.41) | -2.835*** | (-14.61) | -2.837*** | (-14.60) |
| athrho | | | | | | | | |
| Constant | -1.249*** | (-3.04) | -1.249*** | (-5.36) | 1.324*** | (3.37) | -1.459*** | (-15.40) |
| lnsigma | | | | | | | | |
| Constant | -4.736 | (-0.82) | -4.700 | (-1.54) | -4.401 | (-0.87) | -2.919*** | (-3.47) |
| AIC | 25280.55 | | 25285.55 | | 13090.04 | | 13109.70 | |
| BIC | 25725.93 | | 25799.46 | | 13622.48 | | 13769.28 | |
| Observations | 38760 | | 38760 | | 20885 | | 20885 | |

Table 18: Effect of the PHI on fertility in alternative ET-models

| | Model 5 | | Model 6 | | Model 7 | | Model 8 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.217** | (2.10) | 0.239* | (1.85) | 0.241* | (1.94) | 0.486*** | (2.68) |
| **Partner in PHI** | | | | | 0.0154 | (0.17) | -0.0659 | (-0.59) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.350 | (-0.92) | -0.308 | (-0.81) | 1.794*** | (2.85) | 1.875*** | (2.87) |
| 25–29 | 0.503*** | (4.62) | 0.479*** | (4.37) | 0.190 | (1.14) | 0.183 | (1.08) |
| 30–34 | 0.265** | (2.28) | 0.215* | (1.80) | -0.122 | (-0.71) | -0.126 | (-0.72) |
| 35–39 | -0.694*** | (-5.28) | -0.748*** | (-5.56) | -1.080*** | (-5.71) | -1.066*** | (-5.53) |
| 40–44 | -2.599*** | (-15.10) | -2.649*** | (-15.15) | -3.028*** | (-12.95) | -3.001*** | (-12.66) |
| 45–49 | -6.139*** | (-8.64) | -6.193*** | (-8.67) | -6.814*** | (-6.74) | -6.778*** | (-6.69) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.329* | (-1.71) | -0.303 | (-1.59) | -0.400 | (-0.62) | -0.381 | (-0.59) |
| Single | -1.312*** | (-17.46) | -1.314*** | (-17.44) | -0.763*** | (-7.66) | -0.751*** | (-7.43) |
| Divorced | -0.357*** | (-2.74) | -0.360*** | (-2.75) | -0.139 | (-0.61) | -0.0978 | (-0.42) |
| Widowed | -0.0517 | (-0.09) | -0.150 | (-0.26) | -21.25*** | (-63.19) | -19.29*** | (-53.29) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0651 | (-0.92) | -0.0310 | (-0.44) | -0.0808 | (-0.90) | -0.0595 | (-0.66) |
| 2 children | -0.932*** | (-8.37) | -0.884*** | (-7.81) | -0.998*** | (-7.38) | -0.993*** | (-7.25) |
| 3 children | -0.969*** | (-4.02) | -0.938*** | (-3.83) | -1.091*** | (-3.67) | -1.097*** | (-3.62) |
| 4+ children | 0.107 | (0.31) | 0.00383 | (0.01) | 0.0503 | (0.11) | 0.0189 | (0.04) |
| **Migration background** | | | | | | | | |
| Direct | 0.0914 | (1.07) | 0.122 | (1.39) | 0.0235 | (0.22) | 0.0531 | (0.48) |
| Indirect | 0.0226 | (0.23) | 0.0434 | (0.44) | 0.166 | (1.34) | 0.216* | (1.69) |
| **West Germany** | -0.163** | (-2.50) | | | 0.0442 | (0.51) | | |
| **States** | | | | | | | | |
| Schleswig-Holstein | | | -0.0377 | (-0.17) | | | 0.166 | (0.50) |
| Hamburg | | | 0.0659 | (0.27) | | | 0.312 | (0.93) |
| Lower Saxony | | | -0.0965 | (-0.58) | | | 0.387 | (1.63) |
| Bremen | | | 0.0792 | (0.24) | | | 0.0586 | (0.12) |
| North-Rhine-Westfalia | | | -0.127 | (-0.83) | | | 0.293 | (1.30) |
| Hessen | | | -0.436** | (-2.42) | | | -0.122 | (-0.48) |
| Rheinland-Pfalz | | | -0.289 | (-1.43) | | | 0.223 | (0.80) |
| Baden-Wuerttemberg | | | -0.186 | (-1.17) | | | 0.264 | (1.14) |
| Bavaria | | | -0.0717 | (-0.47) | | | 0.259 | (1.13) |
| Saarland | | | -0.211 | (-0.71) | | | -0.173 | (-0.42) |
| Brandenburg | | | 0.119 | (0.62) | | | 0.313 | (1.12) |
| Mecklenburg-Vorpommern | | | 0.00911 | (0.04) | | | -0.236 | (-0.66) |
| Saxony | | | 0.117 | (0.71) | | | 0.298 | (1.23) |
| Saxony-Anhalt | | | -0.0357 | (-0.19) | | | 0.202 | (0.75) |
| Thuringia | | | -0.140 | (-0.73) | | | 0.115 | (0.42) |
| **Education** | | | | | | | | |
| Inadequately | -0.0835 | (-0.24) | -0.155 | (-0.45) | -0.0567 | (-0.10) | -0.0476 | (-0.08) |
| Middle vocational | 0.174* | (1.69) | 0.184* | (1.76) | 0.132 | (0.98) | 0.139 | (0.99) |
| Vocational plus Abi | 0.180 | (1.46) | 0.181 | (1.45) | 0.141 | (0.89) | 0.135 | (0.83) |
| Higher vocational | 0.341*** | (2.65) | 0.335*** | (2.59) | 0.195 | (1.19) | 0.168 | (0.99) |
| Higher education | 0.500*** | (4.45) | 0.498*** | (4.33) | 0.454*** | (3.13) | 0.454*** | (2.96) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.166 | (-0.41) | -0.165 | (-0.39) |
| Middle Vocational | | | | | -0.0489 | (-0.35) | -0.0220 | (-0.16) |
| Vocational Plus Abi | | | | | 0.213 | (1.26) | 0.245 | (1.44) |
| Higher Vocational | | | | | 0.197 | (1.18) | 0.226 | (1.33) |
| Higher Education | | | | | 0.235 | (1.59) | 0.266* | (1.73) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0699 | (0.31) | | | -0.220 | (-0.67) |
| High-level | | | -0.188 | (-0.96) | | | -0.312 | (-1.29) |
| Executive | | | -0.0212 | (-0.08) | | | -0.314 | (-1.02) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.233 | (0.97) |
| High-level | | | | | | | 0.193 | (0.98) |
| Executive | | | | | | | 0.158 | (0.53) |
| **Sisters and brothers** | | | | | | | | |
| 1 | | | 0.0325 | (0.36) | | | 0.181 | (1.49) |
| 2 | | | -0.0552 | (-0.57) | | | 0.134 | (1.05) |
| 3 | | | -0.0266 | (-0.22) | | | -0.0326 | (-0.20) |
| 4 | | | -0.173 | (-1.12) | | | -0.283 | (-1.33) |
| 5 | | | -0.0673 | (-0.38) | | | -0.0999 | (-0.41) |
| 6+ | | | 0.323* | (1.93) | | | 0.435* | (1.94) |
| **Partner's sisters and brothers** | | | | | | | | |
| 1 | | | | | | | -0.156 | (-1.40) |
| 2 | | | | | | | -0.203* | (-1.69) |
| 3 | | | | | | | 0.0254 | (0.19) |
| 4 | | | | | | | -0.294 | (-1.55) |
| 5 | | | | | | | -0.0390 | (-0.17) |
| 6+ | | | | | | | 0.0365 | (0.18) |

## Continuation of Table 18

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.102 | (1.30) | | | 0.0857 | (0.84) |
| Satisfactory | | | 0.0511 | (0.57) | | | 0.00202 | (0.02) |
| Poor | | | 0.279** | (2.31) | | | -0.00634 | (-0.04) |
| Bad | | | 0.139 | (0.39) | | | -0.717 | (-1.01) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0939 | (0.92) |
| Satisfactory | | | | | | | -0.0544 | (-0.45) |
| Poor | | | | | | | -0.202 | (-1.06) |
| Bad | | | | | | | 0.321 | (0.72) |
| **Rel. income in t-1** | | | 0.138** | (2.56) | | | 0.0501 | (0.63) |
| **Partner's rel. income in t-1** | | | | | | | -0.0349 | (-0.58) |
| Constant | -2.272*** | (-14.73) | -2.437*** | (-10.85) | -2.122*** | (-8.74) | -2.431*** | (-6.51) |

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.0780 | (0.67) | 0.0780 | (0.67) | -5.458*** | (-28.16) | -2.493*** | (-12.01) |
| 25–29 | -0.140** | (-2.55) | -0.140** | (-2.55) | 0.0784 | (0.42) | 0.0795 | (0.42) |
| 30–34 | -0.170*** | (-3.23) | -0.170*** | (-3.23) | 0.154 | (0.85) | 0.156 | (0.86) |
| 35–39 | -0.0884* | (-1.68) | -0.0884* | (-1.68) | 0.220 | (1.22) | 0.224 | (1.24) |
| 40–44 | -0.0698 | (-1.33) | -0.0698 | (-1.33) | 0.224 | (1.25) | 0.227 | (1.26) |
| 45–49 | 0.0551 | (1.04) | 0.0552 | (1.04) | 0.313* | (1.74) | 0.316* | (1.76) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.273*** | (-3.49) | -0.272*** | (-3.49) | -0.207 | (-0.83) | -0.209 | (-0.83) |
| Single | -0.0136 | (-0.45) | -0.0136 | (-0.45) | -0.0757 | (-1.36) | -0.0752 | (-1.35) |
| Divorced | -0.209*** | (-4.96) | -0.209*** | (-4.95) | -0.115 | (-1.16) | -0.116 | (-1.17) |
| Widowed | -0.111 | (-0.98) | -0.111 | (-0.98) | 0.0418 | (0.10) | 0.0418 | (0.10) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.129*** | (4.60) | 0.129*** | (4.60) | 0.169*** | (4.23) | 0.169*** | (4.21) |
| 2 children | 0.196*** | (5.47) | 0.196*** | (5.47) | 0.200*** | (4.25) | 0.200*** | (4.24) |
| 3 children | 0.255*** | (3.34) | 0.255*** | (3.34) | 0.198* | (1.95) | 0.198* | (1.95) |
| 4+ children | -0.162 | (-0.53) | -0.162 | (-0.53) | -2.263*** | (-3.98) | -2.259*** | (-3.97) |
| **Migration background** | | | | | | | | |
| Direct | -0.360*** | (-8.16) | -0.360*** | (-8.15) | -0.195*** | (-3.26) | -0.195*** | (-3.26) |
| Indirect | -0.242*** | (-5.37) | -0.242*** | (-5.37) | -0.185** | (-2.46) | -0.186** | (-2.46) |
| **States** | | | | | | | | |
| Schleswig-Holstein | -0.330*** | (-3.85) | -0.330*** | (-3.85) | -0.242* | (-1.90) | -0.242* | (-1.90) |
| Hamburg | -0.0839 | (-0.87) | -0.0839 | (-0.87) | 0.207 | (1.53) | 0.207 | (1.52) |
| Lower Saxony | -0.283*** | (-4.33) | -0.283*** | (-4.33) | -0.128 | (-1.31) | -0.127 | (-1.30) |
| Bremen | -1.067*** | (-3.98) | -1.067*** | (-3.98) | -0.806** | (-2.03) | -0.806** | (-2.03) |
| North-Rhine-Westfalia | -0.0258 | (-0.46) | -0.0258 | (-0.46) | 0.0825 | (0.97) | 0.0833 | (0.98) |
| Hessen | -0.0349 | (-0.55) | -0.0348 | (-0.55) | -0.0287 | (-0.30) | -0.0288 | (-0.30) |
| Rheinland-Pfalz | -0.319*** | (-4.02) | -0.319*** | (-4.02) | -0.401*** | (-3.24) | -0.402*** | (-3.24) |
| Baden-Wuerttemberg | -0.110* | (-1.84) | -0.110* | (-1.84) | 0.0000144 | (0.00) | -0.000331 | (-0.00) |
| Bavaria | -0.0122 | (-0.21) | -0.0122 | (-0.21) | 0.125 | (1.43) | 0.125 | (1.43) |
| Saarland | -0.141 | (-1.23) | -0.141 | (-1.23) | -0.0586 | (-0.34) | -0.0587 | (-0.34) |
| Brandenburg | -0.558*** | (-6.46) | -0.558*** | (-6.46) | -0.389*** | (-3.11) | -0.390*** | (-3.12) |
| Mecklenburg-Vorpommern | -0.206** | (-2.31) | -0.206** | (-2.31) | -0.0761 | (-0.54) | -0.0763 | (-0.54) |
| Saxony | -0.274*** | (-4.23) | -0.274*** | (-4.23) | -0.0726 | (-0.74) | -0.0728 | (-0.74) |
| Saxony-Anhalt | -0.378*** | (-5.00) | -0.378*** | (-5.00) | -0.209* | (-1.85) | -0.209* | (-1.85) |
| Thuringia | -0.457*** | (-5.58) | -0.457*** | (-5.58) | -0.381*** | (-3.19) | -0.380*** | (-3.19) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.879*** | (39.51) | 2.879*** | (39.50) | 3.054*** | (27.08) | 3.055*** | (27.06) |
| High-level | 3.057*** | (47.38) | 3.057*** | (47.39) | 3.005*** | (28.84) | 3.005*** | (28.86) |
| Executive | 3.094*** | (28.57) | 3.094*** | (28.56) | 3.086*** | (16.60) | 3.084*** | (16.61) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.129 | (-1.43) | -0.129 | (-1.43) |
| High-level | | | | | 0.120 | (1.57) | 0.120 | (1.57) |
| Executive | | | | | 0.165 | (1.45) | 0.165 | (1.45) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.0906*** | (-2.77) | -0.0906*** | (-2.77) | 0.0196 | (0.39) | 0.0200 | (0.39) |
| Satisfactory | -0.195*** | (-5.35) | -0.195*** | (-5.35) | -0.0958* | (-1.72) | -0.0955* | (-1.71) |
| Poor | -0.270*** | (-5.23) | -0.270*** | (-5.23) | -0.253*** | (-3.03) | -0.253*** | (-3.03) |
| Bad | -0.474*** | (-3.31) | -0.474*** | (-3.31) | -0.464* | (-1.81) | -0.461* | (-1.79) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | 0.000758 | (0.01) | 0.000208 | (0.00) |
| Satisfactory | | | | | -0.0315 | (-0.53) | -0.0324 | (-0.54) |
| Poor | | | | | -0.00233 | (-0.03) | -0.00300 | (-0.04) |
| Bad | | | | | -0.405 | (-1.54) | -0.406 | (-1.54) |
| **Rel. income in t-1** | 0.666*** | (25.50) | 0.666*** | (25.51) | 0.706*** | (20.03) | 0.707*** | (20.02) |
| **Partner's rel. income in t-1** | | | | | 0.00188 | (0.09) | 0.00184 | (0.09) |
| **Partner in PHI** | | | | | 1.059*** | (29.13) | 1.059*** | (29.13) |
| Constant | -1.694*** | (-21.50) | -1.694*** | (-21.50) | -2.614*** | (-12.72) | -2.617*** | (-12.71) |
| athrho | | | | | | | | |
| Constant | -1.266*** | (-2.66) | -1.296*** | (-6.25) | 1.380*** | (4.44) | -1.497*** | (-12.28) |
| lnsigma | | | | | | | | |
| Constant | -4.980 | (-0.66) | -4.512* | (-1.71) | -3.936 | (-1.24) | -2.890*** | (-3.45) |
| AIC | 25018.02 | | 25040.01 | | 12896.37 | | 12933.53 | |
| BIC | 25582.96 | | 25845.52 | | 13539.31 | | 13909.84 | |
| Observations | 38548 | | 38548 | | 20693 | | 20693 | |

Table 19: Effect of the PHI on fertility in random-effects models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.210*** | (2.59) | 0.214** | (2.00) | 0.267*** | (2.71) | 0.337** | (2.47) |
| **Partner in PHI** | | | | | 0.0265 | (0.31) | -0.0300 | (-0.28) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.384 | (-1.03) | -0.351 | (-0.94) | 1.829*** | (2.90) | 1.836*** | (2.85) |
| 25–29 | 0.514*** | (4.85) | 0.494*** | (4.64) | 0.194 | (1.21) | 0.182 | (1.12) |
| 30–34 | 0.281** | (2.44) | 0.232** | (1.98) | -0.119 | (-0.71) | -0.134 | (-0.78) |
| 35–39 | -0.671*** | (-5.17) | -0.726*** | (-5.52) | -1.076*** | (-5.83) | -1.084*** | (-5.78) |
| 40–44 | -2.587*** | (-15.16) | -2.636*** | (-15.34) | -3.009*** | (-13.16) | -3.001*** | (-12.98) |
| 45–49 | -6.127*** | (-8.60) | -6.180*** | (-8.67) | -6.817*** | (-6.73) | -6.796*** | (-6.73) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.333* | (-1.74) | -0.329* | (-1.73) | -0.403 | (-0.59) | -0.396 | (-0.59) |
| Single | -1.318*** | (-17.30) | -1.311*** | (-17.26) | -0.791*** | (-8.10) | -0.794*** | (-8.10) |
| Divorced | -0.370*** | (-2.84) | -0.384*** | (-2.94) | -0.159 | (-0.68) | -0.168 | (-0.70) |
| Widowed | -0.0586 | (-0.11) | -0.0952 | (-0.17) | -25.78*** | (-44.34) | -25.68*** | (-44.19) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0693 | (-1.04) | -0.0417 | (-0.62) | -0.0772 | (-0.93) | -0.0590 | (-0.69) |
| 2 children | -0.939*** | (-8.50) | -0.890*** | (-7.94) | -1.005*** | (-7.59) | -0.980*** | (-7.25) |
| 3 children | -0.975*** | (-4.01) | -0.932*** | (-3.82) | -1.096*** | (-3.62) | -1.087*** | (-3.55) |
| 4+ children | 0.106 | (0.30) | 0.129 | (0.37) | 0.0508 | (0.11) | 0.0601 | (0.13) |
| **Migration background** | | | | | | | | |
| Direct | 0.0922 | (1.10) | 0.106 | (1.26) | 0.0213 | (0.20) | 0.0176 | (0.17) |
| Indirect | 0.0180 | (0.18) | 0.0159 | (0.16) | 0.146 | (1.15) | 0.140 | (1.10) |
| **West Germany** | -0.163** | (-2.56) | -0.164** | (-2.55) | 0.0535 | (0.67) | 0.0781 | (0.96) |
| **Education** | | | | | | | | |
| Inadequately | -0.0963 | (-0.28) | -0.108 | (-0.31) | -0.0575 | (-0.10) | -0.0336 | (-0.06) |
| Middle vocational | 0.178* | (1.69) | 0.182* | (1.71) | 0.130 | (0.97) | 0.136 | (0.99) |
| Vocational plus Abi | 0.185 | (1.49) | 0.180 | (1.44) | 0.134 | (0.85) | 0.132 | (0.82) |
| Higher vocational | 0.343*** | (2.71) | 0.341*** | (2.67) | 0.196 | (1.24) | 0.200 | (1.23) |
| Higher education | 0.513*** | (4.56) | 0.507*** | (4.44) | 0.457*** | (3.23) | 0.467*** | (3.19) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.162 | (-0.39) | -0.122 | (-0.29) |
| Middle vocational | | | | | -0.0327 | (-0.24) | -0.00441 | (-0.03) |
| Vocational plus Abi | | | | | 0.236 | (1.44) | 0.257 | (1.55) |
| Higher vocational | | | | | 0.220 | (1.39) | 0.243 | (1.52) |
| Higher education | | | | | 0.243* | (1.71) | 0.276* | (1.84) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0596 | (0.28) | | | -0.0820 | (-0.28) |
| High-level | | | -0.143 | (-0.72) | | | -0.218 | (-0.91) |
| Executive | | | 0.0289 | (0.13) | | | -0.208 | (-0.86) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.193 | (0.85) |
| High-level | | | | | | | 0.181 | (1.05) |
| Executive | | | | | | | 0.0903 | (0.33) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0942 | (1.22) | | | 0.0949 | (0.96) |
| Satisfactory | | | 0.0416 | (0.46) | | | 0.0127 | (0.11) |
| Poor | | | 0.290** | (2.44) | | | 0.0286 | (0.17) |
| Bad | | | 0.138 | (0.39) | | | -0.700 | (-0.99) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0592 | (0.61) |
| Satisfactory | | | | | | | -0.0949 | (-0.83) |
| Poor | | | | | | | -0.244 | (-1.25) |
| Bad | | | | | | | 0.224 | (0.51) |
| **Rel. income in t-1** | | | 0.138*** | (2.71) | | | 0.0638 | (0.82) |
| **Partner's rel. income in t-1** | | | | | | | -0.0355 | (-0.61) |
| Constant | -2.288*** | (-14.63) | -2.423*** | (-14.10) | -2.145*** | (-8.74) | -2.250*** | (-7.89) |
| lnalpha | | | | | | | | |
| Constant | -14.34*** | (-7.11) | -15.47*** | (-10.20) | -15.68*** | (-12.74) | -15.50*** | (-11.67) |
| AIC | 9872.075 | | 9877.072 | | 5643.69 | | 5663.517 | |
| BIC | 10086.2 | | 10159.72 | | 5890.041 | | 6037.016 | |
| Observations | 38760 | | 38760 | | 20885 | | 20885 | |

Table 20: Effect of the PHI on fertility in fixed-effects models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.459* | (1.82) | 0.308 | (1.17) | 0.377 | (1.12) | 0.339 | (0.92) |
| **Partner in PHI** | | | | | -0.0104 | (-0.04) | -0.0506 | (-0.18) |
| **Age groups** | | | | | | | | |
| 18–19 | 0.562 | (0.81) | 0.598 | (0.82) | 17.52*** | (19.13) | 17.87*** | (19.70) |
| 25–29 | 1.182*** | (7.48) | 1.205*** | (7.52) | 0.890*** | (3.07) | 0.916*** | (3.05) |
| 30–34 | 1.804*** | (8.90) | 1.837*** | (8.90) | 1.359*** | (4.07) | 1.409*** | (4.06) |
| 35–39 | 1.967*** | (7.64) | 1.992*** | (7.61) | 1.451*** | (3.69) | 1.524*** | (3.72) |
| 40–44 | 1.079*** | (3.33) | 1.088*** | (3.30) | 0.456 | (0.95) | 0.510 | (1.01) |
| 45–49 | -1.777** | (-2.11) | -1.788** | (-2.12) | -2.391** | (-2.05) | -2.359** | (-2.02) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.00428 | (-0.02) | -0.0131 | (-0.05) | 0.930 | (1.15) | 1.048 | (1.30) |
| Single | -1.055*** | (-8.56) | -1.084*** | (-8.69) | -0.859*** | (-5.00) | -0.898*** | (-5.12) |
| Divorced | 0.0926 | (0.36) | 0.0807 | (0.31) | 0.177 | (0.27) | 0.296 | (0.43) |
| Widowed | 0.958 | (1.47) | 0.847 | (1.30) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -1.399*** | (-12.52) | -1.481*** | (-12.17) | -1.271*** | (-8.58) | -1.405*** | (-8.37) |
| 2 children | -3.249*** | (-15.47) | -3.364*** | (-15.22) | -3.066*** | (-10.83) | -3.276*** | (-10.70) |
| 3 children | -4.531*** | (-9.25) | -4.683*** | (-9.29) | -4.098*** | (-7.58) | -4.359*** | (-7.76) |
| 4+ children | -4.004*** | (-5.10) | -4.204*** | (-5.16) | -4.371*** | (-6.82) | -4.728*** | (-7.17) |
| **Migration background** | | | | | | | | |
| Direct | 0 | . | 0 | . | 0 | . | 0 | . |
| Indirect | 0 | . | 0 | . | 0 | . | 0 | . |
| **West Germany** | -0.270 | (-0.81) | -0.304 | (-0.90) | 0.484 | (0.57) | 0.487 | (0.55) |
| **Education** | | | | | | | | |
| Inadequately | -0.691 | (-0.90) | -1.075 | (-1.33) | 0 | . | 0 | . |
| Middle vocational | 0.519 | (1.30) | 0.562 | (1.40) | 0.315 | (0.36) | 0.378 | (0.46) |
| Vocational plus Abi | 0.577 | (1.10) | 0.649 | (1.21) | 0.551 | (0.45) | 0.631 | (0.53) |
| Higher vocational | 1.287* | (1.80) | 1.398* | (1.85) | 16.30*** | (12.48) | 16.79*** | (13.04) |
| Higher education | 2.035*** | (3.51) | 2.170*** | (3.68) | 1.705 | (1.23) | 1.825 | (1.37) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -13.46*** | (-10.42) | -13.44*** | (-9.93) |
| Middle vocational | | | | | -0.177 | (-0.23) | -0.00339 | (-0.00) |
| Vocational plus Abi | | | | | 1.624* | (1.82) | 1.860** | (2.01) |
| Higher vocational | | | | | 1.198 | (1.40) | 1.345 | (1.51) |
| Higher education | | | | | 1.343 | (1.33) | 1.490 | (1.39) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 1.326*** | (3.37) | | | 1.691** | (2.19) |
| High-level | | | 0.463 | (1.39) | | | 0.610 | (1.58) |
| Executive | | | -0.0261 | (-0.07) | | | -0.0912 | (-0.22) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.491 | (0.63) |
| High-level | | | | | | | 0.772 | (1.42) |
| Executive | | | | | | | -0.421 | (-0.59) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.118 | (1.06) | | | 0.172 | (1.10) |
| Satisfactory | | | 0.161 | (1.20) | | | 0.171 | (0.92) |
| Poor | | | 0.518*** | (2.90) | | | 0.311 | (1.26) |
| Bad | | | 0.400 | (0.82) | | | -14.50*** | (-19.08) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | -0.148 | (-0.87) |
| Satisfactory | | | | | | | -0.243 | (-1.20) |
| Poor | | | | | | | -0.421 | (-1.27) |
| Bad | | | | | | | -0.263 | (-0.30) |
| **Rel. income in t-1** | | | -0.138 | (-1.14) | | | -0.250 | (-1.28) |
| **Partner's rel. income in t-1** | | | | | | | -0.0367 | (-0.21) |
| AIC | 3629.27 | | 3624.863 | | 1915.867 | | 1926.183 | |
| BIC | 3773.37 | | 3823.859 | | 2069.787 | | 2178.612 | |
| Observations | 7058 | | 7058 | | 3487 | | 3487 | |

## Table 21: Effect of health insurance status on fertility in RE-models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **Health insurance status** | | | | | | | | |
| $SHI_{Man}$ | -0.245*** | (-2.86) | -0.274** | (-2.33) | -0.263*** | (-2.58) | -0.344** | (-2.37) |
| $SHI_{Vol}$ | -0.200* | (-1.73) | -0.241* | (-1.76) | -0.278* | (-1.88) | -0.357** | (-2.04) |
| $SHI_{Fam}$ | -0.564*** | (-4.24) | -0.567*** | (-3.58) | -0.514*** | (-3.24) | -0.575*** | (-2.93) |
| $SHI_{Stu}$ | -0.0477 | (-0.28) | -0.0586 | (-0.31) | -0.243 | (-0.86) | -0.308 | (-1.02) |
| $PHI_{Fam}$ | -0.354 | (-1.21) | -0.353 | (-1.18) | 0.00590 | (0.01) | -0.0647 | (-0.15) |
| **Partner's health insurance status** | | | | | | | | |
| $SHI_{Man}$ | | | | | -0.0219 | (-0.24) | 0.00879 | (0.08) |
| $SHI_{Vol}$ | | | | | -0.0403 | (-0.35) | 0.0107 | (0.08) |
| $SHI_{Fam}$ | | | | | -0.558 | (-1.13) | -0.531 | (-1.07) |
| $SHI_{Stu}$ | | | | | -0.135 | (-0.47) | -0.113 | (-0.38) |
| $PHI_{Fam}$ | | | | | -31.56*** | (-102.81) | -27.55*** | (-84.25) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.358 | (-0.97) | -0.329 | (-0.89) | 1.847*** | (2.90) | 1.842*** | (2.81) |
| 25–29 | 0.480*** | (4.50) | 0.468*** | (4.37) | 0.152 | (0.93) | 0.142 | (0.86) |
| 30–34 | 0.242** | (2.10) | 0.205* | (1.76) | -0.159 | (-0.94) | -0.172 | (-1.00) |
| 35–39 | -0.706*** | (-5.45) | -0.748*** | (-5.69) | -1.121*** | (-6.02) | -1.126*** | (-5.95) |
| 40–44 | -2.617*** | (-15.35) | -2.656*** | (-15.46) | -3.050*** | (-13.30) | -3.038*** | (-13.09) |
| 45–49 | -6.151*** | (-8.64) | -6.192*** | (-8.70) | -6.851*** | (-6.76) | -6.826*** | (-6.76) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.346* | (-1.81) | -0.341* | (-1.80) | -0.390 | (-0.58) | -0.389 | (-0.58) |
| Single | -1.336*** | (-17.53) | -1.330*** | (-17.48) | -0.817*** | (-8.32) | -0.821*** | (-8.32) |
| Divorced | -0.412*** | (-3.15) | -0.419*** | (-3.20) | -0.181 | (-0.77) | -0.185 | (-0.77) |
| Widowed | -0.101 | (-0.18) | -0.130 | (-0.24) | -30.26*** | (-52.36) | -26.22*** | (-45.37) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0448 | (-0.67) | -0.0264 | (-0.39) | -0.0514 | (-0.61) | -0.0405 | (-0.47) |
| 2 children | -0.888*** | (-8.06) | -0.855*** | (-7.63) | -0.969*** | (-7.30) | -0.955*** | (-7.04) |
| 3 children | -0.895*** | (-3.67) | -0.871*** | (-3.56) | -1.018*** | (-3.34) | -1.024*** | (-3.34) |
| 4+ children | 0.179 | (0.51) | 0.204 | (0.58) | 0.126 | (0.26) | 0.124 | (0.26) |
| **Migration background** | | | | | | | | |
| Direct | 0.109 | (1.30) | 0.117 | (1.39) | 0.0386 | (0.36) | 0.0322 | (0.30) |
| Indirect | 0.0125 | (0.13) | 0.00995 | (0.10) | 0.145 | (1.14) | 0.138 | (1.08) |
| **West Germany** | -0.143** | (-2.21) | -0.144** | (-2.20) | 0.0665 | (0.82) | 0.0885 | (1.07) |
| **Education** | | | | | | | | |
| Inadequately | -0.0510 | (-0.15) | -0.0728 | (-0.21) | -0.00368 | (-0.01) | 0.0162 | (0.03) |
| Middle vocational | 0.168 | (1.59) | 0.174 | (1.63) | 0.117 | (0.87) | 0.126 | (0.90) |
| Vocational plus Abi | 0.165 | (1.33) | 0.164 | (1.31) | 0.127 | (0.80) | 0.129 | (0.79) |
| Higher vocational | 0.320** | (2.53) | 0.328** | (2.56) | 0.158 | (0.98) | 0.165 | (1.00) |
| Higher education | 0.490*** | (4.35) | 0.495*** | (4.32) | 0.453*** | (3.19) | 0.467*** | (3.16) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.174 | (-0.41) | -0.146 | (-0.35) |
| Middle vocational | | | | | -0.0336 | (-0.24) | -0.0180 | (-0.13) |
| Vocational plus Abi | | | | | 0.239 | (1.45) | 0.249 | (1.50) |
| Higher vocational | | | | | 0.224 | (1.40) | 0.235 | (1.46) |
| Higher education | | | | | 0.244* | (1.70) | 0.259* | (1.72) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0277 | (0.13) | | | -0.0899 | (-0.31) |
| High-level | | | -0.185 | (-0.91) | | | -0.210 | (-0.86) |
| Executive | | | -0.0149 | (-0.07) | | | -0.226 | (-0.92) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.0893 | (0.40) |
| High-level | | | | | | | 0.150 | (0.87) |
| Executive | | | | | | | 0.0750 | (0.27) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0945 | (1.22) | | | 0.0948 | (0.96) |
| Satisfactory | | | 0.0391 | (0.44) | | | 0.00137 | (0.01) |
| Poor | | | 0.291** | (2.45) | | | 0.0335 | (0.20) |
| Bad | | | 0.152 | (0.43) | | | -0.673 | (-0.95) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0635 | (0.66) |
| Satisfactory | | | | | | | -0.103 | (-0.90) |
| Poor | | | | | | | -0.237 | (-1.22) |
| Bad | | | | | | | 0.226 | (0.52) |
| **Rel. income in t-1** | | | 0.104* | (1.85) | | | 0.0410 | (0.48) |
| **Partner's rel. income in t-1** | | | | | | | -0.0378 | (-0.62) |
| Constant | -2.001*** | (-11.42) | -2.100*** | (-10.01) | -1.792*** | (-6.75) | -1.823*** | (-5.53) |
| lnalpha | | | | | | | | |
| Constant | -15.50*** | (-9.25) | -14.27*** | (-6.45) | -15.16*** | (-8.74) | -15.02*** | (-8.87) |
| AIC | 9855.66 | | 9862.285 | | 5622.68 | | 5642.818 | |
| BIC | 10103.99 | | 10179.12 | | 5932.416 | | 6079.624 | |
| Observations | 38683 | | 38683 | | 20784 | | 20784 | |

Table 22: Effect of health insurance status on fertility in FE-models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **Health insurance status** | | | | | | | | |
| $SHI_{Man}$ | -0.464* | (-1.67) | -0.315 | (-1.09) | -0.355 | (-0.92) | -0.303 | (-0.73) |
| $SHI_{Vol}$ | -0.320 | (-1.08) | -0.174 | (-0.57) | -0.146 | (-0.36) | -0.0362 | (-0.08) |
| $SHI_{Fam}$ | -1.070*** | (-3.31) | -0.940*** | (-2.82) | -0.968** | (-2.18) | -0.915* | (-1.92) |
| $SHI_{Stu}$ | -0.426 | (-1.13) | -0.307 | (-0.80) | -0.617 | (-1.10) | -0.528 | (-0.92) |
| $PHI_{Fam}$ | -0.104 | (-0.16) | -0.0462 | (-0.07) | 0.298 | (0.31) | 0.374 | (0.41) |
| **Partner's health insurance status** | | | | | | | | |
| $SHI_{Man}$ | | | | | -0.00301 | (-0.01) | 0.0266 | (0.09) |
| $SHI_{Vol}$ | | | | | 0.00380 | (0.01) | 0.0722 | (0.24) |
| $SHI_{Fam}$ | | | | | -0.245 | (-0.37) | -0.176 | (-0.24) |
| $SHI_{Stu}$ | | | | | -0.252 | (-0.43) | -0.252 | (-0.41) |
| $PHI_{Fam}$ | | | | | -14.45*** | (-28.67) | -14.49*** | (-29.11) |
| **Age groups** | | | | | | | | |
| 18–19 | 0.682 | (1.00) | 0.728 | (1.02) | 17.89*** | (20.90) | 17.97*** | (21.04) |
| 25–29 | 1.158*** | (7.32) | 1.185*** | (7.38) | 0.829*** | (2.99) | 0.847*** | (2.98) |
| 30–34 | 1.769*** | (8.74) | 1.803*** | (8.76) | 1.299*** | (3.97) | 1.332*** | (3.96) |
| 35–39 | 1.940*** | (7.54) | 1.959*** | (7.49) | 1.405*** | (3.61) | 1.453*** | (3.62) |
| 40–44 | 1.068*** | (3.29) | 1.061*** | (3.21) | 0.428 | (0.89) | 0.436 | (0.87) |
| 45–49 | -1.849** | (-2.17) | -1.885** | (-2.20) | -2.419** | (-2.07) | -2.453** | (-2.10) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.0471 | (-0.17) | -0.0645 | (-0.23) | 0.964 | (1.18) | 1.088 | (1.30) |
| Single | -1.105*** | (-8.93) | -1.136*** | (-9.08) | -0.874*** | (-5.07) | -0.914*** | (-5.18) |
| Divorced | 0.0430 | (0.16) | 0.0309 | (0.12) | 0.156 | (0.23) | 0.288 | (0.42) |
| Widowed | 0.918 | (1.40) | 0.798 | (1.22) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -1.359*** | (-12.04) | -1.458*** | (-11.85) | -1.235*** | (-8.15) | -1.393*** | (-8.12) |
| 2 children | -3.190*** | (-15.06) | -3.325*** | (-14.92) | -3.031*** | (-10.52) | -3.280*** | (-10.59) |
| 3 children | -4.461*** | (-8.84) | -4.633*** | (-8.90) | -3.966*** | (-7.14) | -4.248*** | (-7.45) |
| 4+ children | -3.994*** | (-5.15) | -4.216*** | (-5.20) | -4.310*** | (-6.97) | -4.709*** | (-7.39) |
| **Migration background** | | | | | | | | |
| Direct | 0 | . | 0 | . | 0 | . | 0 | . |
| Indirect | 0 | . | 0 | . | 0 | . | 0 | . |
| **West Germany** | -0.280 | (-0.85) | -0.312 | (-0.92) | 0.398 | (0.47) | 0.414 | (0.46) |
| **Education** | | | | | | | | |
| Inadequately | -0.383 | (-0.49) | -0.709 | (-0.87) | 0 | . | 0 | . |
| Middle vocational | 0.551 | (1.37) | 0.606 | (1.50) | 0.272 | (0.37) | 0.349 | (0.49) |
| Vocational plus Abi | 0.675 | (1.25) | 0.771 | (1.40) | 0.650 | (0.56) | 0.740 | (0.65) |
| Higher vocational | 1.667** | (2.35) | 1.829** | (2.47) | 16.83*** | (13.47) | 17.09*** | (13.74) |
| Higher education | 1.935*** | (3.17) | 2.100*** | (3.36) | 1.595 | (1.19) | 1.733 | (1.33) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -13.95*** | (-10.56) | -13.63*** | (-9.75) |
| Middle vocational | | | | | -0.258 | (-0.32) | -0.0507 | (-0.06) |
| Vocational plus Abi | | | | | 1.478 | (1.56) | 1.787* | (1.84) |
| Higher vocational | | | | | 1.112 | (1.24) | 1.320 | (1.42) |
| Higher education | | | | | 1.217 | (1.10) | 1.541 | (1.31) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 1.319*** | (3.34) | | | 1.683** | (2.17) |
| High-level | | | 0.458 | (1.37) | | | 0.629 | (1.64) |
| Executive | | | -0.0432 | (-0.12) | | | -0.0766 | (-0.18) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.555 | (0.66) |
| High-level | | | | | | | 0.742 | (1.25) |
| Executive | | | | | | | -0.442 | (-0.63) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.118 | (1.06) | | | 0.170 | (1.10) |
| Satisfactory | | | 0.157 | (1.17) | | | 0.187 | (1.01) |
| Poor | | | 0.526*** | (2.92) | | | 0.294 | (1.18) |
| Bad | | | 0.456 | (0.92) | | | -14.73*** | (-18.13) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | -0.156 | (-0.92) |
| Satisfactory | | | | | | | -0.233 | (-1.15) |
| Poor | | | | | | | -0.425 | (-1.28) |
| Bad | | | | | | | -0.328 | (-0.37) |
| **Rel. income in t-1** | | | -0.196 | (-1.60) | | | -0.309 | (-1.53) |
| **Partner's rel. income in t-1** | | | | | | | -0.0705 | (-0.40) |
| AIC | 3617.629 | | 3611.924 | | 1910.218 | | 1919.246 | |
| BIC | 3789.127 | | 3838.302 | | 2113.231 | | 2220.69 | |
| Observations | 7044 | | 7044 | | 3470 | | 3470 | |

Table 23: Effect of the PHI on fertility in Logit estimations with RE

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | A birth occured during the period | | | | | | | |
| **PHI** | 0.206** | (2.28) | 0.219* | (1.81) | 0.287** | (2.54) | 0.361** | (2.23) |
| **Partner in PHI** | | | | | 0.0647 | (0.68) | 0.00900 | (0.08) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.370 | (-0.97) | -0.336 | (-0.88) | 2.206** | (2.41) | 2.210** | (2.37) |
| 25–29 | 0.547*** | (4.92) | 0.525*** | (4.70) | 0.213 | (1.17) | 0.200 | (1.09) |
| 30–34 | 0.287** | (2.36) | 0.235* | (1.90) | -0.165 | (-0.87) | -0.181 | (-0.94) |
| 35–39 | -0.763*** | (-5.58) | -0.823*** | (-5.92) | -1.234*** | (-6.06) | -1.244*** | (-6.00) |
| 40–44 | -2.707*** | (-15.39) | -2.761*** | (-15.55) | -3.190*** | (-13.03) | -3.184*** | (-12.84) |
| 45–49 | -6.265*** | (-8.78) | -6.326*** | (-8.86) | -7.022*** | (-6.92) | -7.005*** | (-6.92) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.350* | (-1.67) | -0.347* | (-1.66) | -0.448 | (-0.60) | -0.440 | (-0.60) |
| Single | -1.434*** | (-17.19) | -1.427*** | (-17.18) | -0.898*** | (-8.00) | -0.904*** | (-8.02) |
| Divorced | -0.422*** | (-3.06) | -0.438*** | (-3.17) | -0.226 | (-0.89) | -0.238 | (-0.93) |
| Widowed | -0.0565 | (-0.10) | -0.0943 | (-0.16) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0772 | (-1.05) | -0.0469 | (-0.63) | -0.0897 | (-0.96) | -0.0686 | (-0.72) |
| 2 children | -1.015*** | (-8.79) | -0.962*** | (-8.23) | -1.090*** | (-8.00) | -1.064*** | (-7.64) |
| 3 children | -1.033*** | (-4.06) | -0.987*** | (-3.87) | -1.159*** | (-3.67) | -1.146*** | (-3.60) |
| 4+ children | 0.128 | (0.33) | 0.166 | (0.42) | 0.0782 | (0.15) | 0.0944 | (0.18) |
| **Migration background** | | | | | | | | |
| Direct | 0.115 | (1.22) | 0.129 | (1.37) | 0.0461 | (0.38) | 0.0384 | (0.32) |
| Indirect | 0.0104 | (0.09) | 0.00766 | (0.07) | 0.143 | (0.98) | 0.136 | (0.93) |
| **West Germany** | -0.191*** | (-2.72) | -0.193*** | (-2.72) | 0.0461 | (0.51) | 0.0751 | (0.81) |
| **Education** | | | | | | | | |
| Inadequately | -0.0837 | (-0.23) | -0.0960 | (-0.26) | -0.0432 | (-0.07) | -0.0193 | (-0.03) |
| Middle vocational | 0.194* | (1.72) | 0.197* | (1.73) | 0.152 | (1.04) | 0.153 | (1.01) |
| Vocational plus Abi | 0.201 | (1.51) | 0.194 | (1.44) | 0.171 | (0.98) | 0.163 | (0.92) |
| Higher vocational | 0.391*** | (2.85) | 0.387*** | (2.79) | 0.238 | (1.37) | 0.237 | (1.32) |
| Higher education | 0.575*** | (4.75) | 0.568*** | (4.57) | 0.544*** | (3.49) | 0.546*** | (3.33) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.140 | (-0.30) | -0.102 | (-0.22) |
| Middle vocational | | | | | -0.00961 | (-0.06) | 0.0207 | (0.13) |
| Vocational plus Abi | | | | | 0.305* | (1.66) | 0.329* | (1.76) |
| Higher vocational | | | | | 0.242 | (1.38) | 0.268 | (1.51) |
| Higher education | | | | | 0.286* | (1.82) | 0.320* | (1.90) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0517 | (0.22) | | | -0.127 | (-0.38) |
| High-level | | | -0.183 | (-0.82) | | | -0.249 | (-0.89) |
| Executive | | | 0.0181 | (0.07) | | | -0.186 | (-0.62) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.174 | (0.70) |
| High-level | | | | | | | 0.239 | (1.18) |
| Executive | | | | | | | 0.104 | (0.31) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0900 | (1.06) | | | 0.0953 | (0.84) |
| Satisfactory | | | 0.0337 | (0.34) | | | 0.00591 | (0.04) |
| Poor | | | 0.296** | (2.27) | | | -0.00640 | (-0.03) |
| Bad | | | 0.159 | (0.41) | | | -0.754 | (-1.00) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0620 | (0.56) |
| Satisfactory | | | | | | | -0.0781 | (-0.60) |
| Poor | | | | | | | -0.271 | (-1.26) |
| Bad | | | | | | | 0.298 | (0.61) |
| **Rel. income in t-1** | | | 0.153*** | (2.66) | | | 0.0766 | (0.86) |
| **Partner's rel. income in t-1** | | | | | | | -0.0486 | (-0.72) |
| Constant | -2.152*** | (-12.68) | -2.288*** | (-12.29) | -2.026*** | (-7.35) | -2.124*** | (-6.71) |
| lnsig2u | | | | | | | | |
| Constant | -10.98 | (-0.00) | -11.00 | (-0.00) | -11.70 | (-0.00) | -11.72 | (-0.00) |
| AIC | 9601.156 | | 9606.002 | | 5440.952 | | 5460.841 | |
| BIC | 9815.285 | | 9888.652 | | 5679.355 | | 5826.394 | |
| Observations | 38760 | | 38760 | | 20885 | | 20885 | |

Table 24: Effect of the PHI on fertility in Probit estimations with RE

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | A birth occured during the period | | | | | | | |
| **PHI** | 0.0890** | (2.03) | 0.0893 | (1.54) | 0.138** | (2.42) | 0.171** | (2.15) |
| **Partner in PHI** | | | | | 0.0414 | (0.84) | 0.0183 | (0.32) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.118 | (-0.78) | -0.0991 | (-0.65) | 1.214** | (2.21) | 1.215** | (2.20) |
| 25–29 | 0.272*** | (5.42) | 0.264*** | (5.25) | 0.138 | (1.51) | 0.133 | (1.44) |
| 30–34 | 0.147*** | (2.67) | 0.124** | (2.22) | -0.0725 | (-0.77) | -0.0803 | (-0.84) |
| 35–39 | -0.354*** | (-5.74) | -0.380*** | (-6.10) | -0.591*** | (-5.89) | -0.595*** | (-5.86) |
| 40–44 | -1.147*** | (-15.78) | -1.174*** | (-15.96) | -1.388*** | (-12.44) | -1.387*** | (-12.26) |
| 45–49 | -2.267*** | (-11.72) | -2.302*** | (-11.73) | -2.581*** | (-9.41) | -2.573*** | (-9.43) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.172* | (-1.74) | -0.177* | (-1.79) | -0.257 | (-0.73) | -0.257 | (-0.73) |
| Single | -0.662*** | (-16.26) | -0.660*** | (-16.25) | -0.420*** | (-7.35) | -0.420*** | (-7.33) |
| Divorced | -0.195*** | (-3.08) | -0.203*** | (-3.19) | -0.105 | (-0.88) | -0.107 | (-0.89) |
| Widowed | 0.0549 | (0.21) | 0.0397 | (0.15) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0180 | (-0.51) | -0.00358 | (-0.10) | -0.0376 | (-0.83) | -0.0257 | (-0.55) |
| 2 children | -0.438*** | (-8.32) | -0.413*** | (-7.77) | -0.484*** | (-7.80) | -0.470*** | (-7.38) |
| 3 children | -0.427*** | (-3.75) | -0.406*** | (-3.56) | -0.466*** | (-3.33) | -0.458*** | (-3.24) |
| 4+ children | 0.0920 | (0.50) | 0.116 | (0.63) | 0.0905 | (0.37) | 0.0960 | (0.40) |
| **Migration background** | | | | | | | | |
| Direct | 0.0499 | (1.08) | 0.0560 | (1.21) | 0.0131 | (0.22) | 0.0108 | (0.18) |
| Indirect | 0.00164 | (0.03) | 0.000450 | (0.01) | 0.0798 | (1.06) | 0.0792 | (1.06) |
| **West Germany** | -0.0855** | (-2.56) | -0.0876*** | (-2.60) | 0.0525 | (1.20) | 0.0662 | (1.47) |
| **Education** | | | | | | | | |
| Inadequately | -0.0551 | (-0.34) | -0.0611 | (-0.37) | -0.0564 | (-0.20) | -0.0490 | (-0.18) |
| Middle vocational | 0.0852* | (1.65) | 0.0866* | (1.65) | 0.0791 | (1.13) | 0.0753 | (1.04) |
| Vocational plus Abi | 0.0960 | (1.55) | 0.0913 | (1.46) | 0.102 | (1.21) | 0.0941 | (1.09) |
| Higher vocational | 0.179*** | (2.78) | 0.178*** | (2.72) | 0.119 | (1.40) | 0.117 | (1.34) |
| Higher education | 0.287*** | (5.03) | 0.280*** | (4.78) | 0.298*** | (3.91) | 0.295*** | (3.66) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.0238 | (-0.10) | -0.00137 | (-0.01) |
| Middle vocational | | | | | -0.00602 | (-0.08) | 0.00788 | (0.10) |
| Vocational plus Abi | | | | | 0.149 | (1.63) | 0.160* | (1.72) |
| Higher vocational | | | | | 0.107 | (1.24) | 0.122 | (1.39) |
| Higher education | | | | | 0.135* | (1.71) | 0.152* | (1.83) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0285 | (0.25) | | | -0.0466 | (-0.28) |
| High-level | | | -0.0950 | (-0.90) | | | -0.139 | (-1.01) |
| Executive | | | 0.0533 | (0.42) | | | -0.0399 | (-0.26) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.106 | (0.85) |
| High-level | | | | | | | 0.0895 | (0.88) |
| Executive | | | | | | | 0.0247 | (0.15) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0512 | (1.27) | | | 0.0521 | (0.93) |
| Satisfactory | | | 0.0253 | (0.54) | | | 0.00393 | (0.06) |
| Poor | | | 0.155** | (2.47) | | | 0.00986 | (0.11) |
| Bad | | | 0.106 | (0.60) | | | -0.336 | (-1.00) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0256 | (0.46) |
| Satisfactory | | | | | | | -0.0528 | (-0.83) |
| Poor | | | | | | | -0.135 | (-1.31) |
| Bad | | | | | | | 0.149 | (0.63) |
| **Rel. income in t-1** | | | 0.0762*** | (3.09) | | | 0.0392 | (0.89) |
| **Partner's rel. income in t-1** | | | | | | | -0.0251 | (-0.77) |
| Constant | -1.279*** | (-16.35) | -1.352*** | (-15.65) | -1.245*** | (-9.31) | -1.289*** | (-8.37) |
| lnsig2u | | | | | | | | |
| Constant | -9.257 | (-0.05) | -10.06 | (-0.02) | -12.18 | (-0.00) | -12.70 | (-0.00) |
| AIC | 9627.585 | | 9630.271 | | 5448.039 | | 5467.138 | |
| BIC | 9841.714 | | 9912.921 | | 5686.443 | | 5832.69 | |
| Observations | 38760 | | 38760 | | 20885 | | 20885 | |

Table 25: Effect of the PHI on fertility among women able to choose in ET-models

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | -0.00621 | (-0.03) | 0.172 | (0.82) | 0.0890 | (0.38) | 0.117 | (0.46) |
| **Partner in PHI** | | | | | 0.218 | (1.31) | 0.152 | (0.72) |
| **Age groups** | | | | | | | | |
| 18–19 | 0.805 | (0.77) | 0.826 | (0.79) | 2.512** | (2.53) | 2.566** | (2.43) |
| 25–29 | 0.992** | (2.47) | 0.995** | (2.48) | 0.308 | (0.58) | 0.345 | (0.64) |
| 30–34 | 1.149*** | (2.86) | 1.129*** | (2.77) | 0.266 | (0.50) | 0.242 | (0.44) |
| 35–39 | 0.485 | (1.16) | 0.446 | (1.05) | -0.435 | (-0.78) | -0.451 | (-0.79) |
| 40–44 | -1.545*** | (-3.22) | -1.572*** | (-3.24) | -2.372*** | (-3.92) | -2.371*** | (-3.79) |
| 45–49 | -22.98*** | (-56.75) | -30.18*** | (-73.13) | -26.63*** | (-50.25) | -23.99*** | (-43.58) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.330 | (-0.78) | -0.322 | (-0.77) | -24.66*** | (-47.47) | -22.73*** | (-40.85) |
| Single | -1.338*** | (-8.79) | -1.335*** | (-8.70) | -0.964*** | (-4.38) | -0.969*** | (-4.33) |
| Divorced | -1.406*** | (-3.47) | -1.386*** | (-3.42) | -0.755 | (-1.34) | -0.800 | (-1.39) |
| Widowed | -21.44*** | (-57.37) | -29.01*** | (-74.78) | 0.881 | (0.81) | 0.704 | (0.62) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.162 | (-1.00) | -0.191 | (-1.13) | -0.0746 | (-0.38) | -0.0559 | (-0.26) |
| 2 children | -1.145*** | (-4.49) | -1.154*** | (-4.46) | -1.183*** | (-4.08) | -1.179*** | (-3.97) |
| 3 children | -2.186** | (-2.20) | -2.203** | (-2.22) | -24.77*** | (-122.00) | -23.01*** | (-91.20) |
| 4+ children | -22.00*** | (-48.20) | -29.03*** | (-62.65) | -24.67*** | (-36.21) | -22.56*** | (-34.83) |
| **Migration background** | | | | | | | | |
| Direct | 0.403* | (1.87) | 0.388* | (1.78) | 0.391 | (1.54) | 0.389 | (1.51) |
| Indirect | -0.154 | (-0.57) | -0.143 | (-0.52) | -0.0245 | (-0.07) | -0.00291 | (-0.01) |
| **West Germany** | -0.0765 | (-0.49) | -0.0789 | (-0.50) | 0.294 | (1.36) | 0.280 | (1.24) |
| **Education** | | | | | | | | |
| Inadequately | 0.470 | (0.65) | 0.415 | (0.58) | 1.585*** | (2.71) | 1.818*** | (2.92) |
| Middle vocational | 0.0328 | (0.12) | 0.0427 | (0.17) | 0.0915 | (0.29) | 0.139 | (0.45) |
| Vocational plus Abi | -0.150 | (-0.45) | -0.148 | (-0.45) | -0.141 | (-0.35) | -0.124 | (-0.31) |
| Higher vocational | 0.227 | (0.75) | 0.247 | (0.83) | 0.0153 | (0.04) | -0.00150 | (-0.00) |
| Higher education | 0.255 | (0.98) | 0.283 | (1.10) | 0.145 | (0.46) | 0.220 | (0.69) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | 0.338 | (0.31) | 0.353 | (0.33) |
| Middle vocational | | | | | 0.173 | (0.48) | 0.253 | (0.70) |
| Vocational plus Abi | | | | | 0.298 | (0.65) | 0.379 | (0.86) |
| Higher vocational | | | | | 0.140 | (0.33) | 0.129 | (0.31) |
| Higher education | | | | | 0.406 | (1.16) | 0.486 | (1.41) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | -0.111 | (-0.44) | | | -0.0406 | (-0.12) |
| Higher-education | | | -0.152 | (-0.67) | | | -0.0554 | (-0.21) |
| Executive | | | -0.0845 | (-0.30) | | | -0.0581 | (-0.17) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.507 | (0.93) |
| Higher-education | | | | | | | 0.251 | (0.84) |
| Executive | | | | | | | -0.456 | (-0.97) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.241 | (1.32) | | | 0.573** | (2.37) |
| Satisfactory | | | 0.346* | (1.68) | | | 0.607** | (2.20) |
| Poor | | | 0.379 | (1.32) | | | 0.418 | (0.98) |
| Bad | | | -28.72*** | (-91.33) | | | -21.91*** | (-43.01) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | -0.104 | (-0.49) |
| Satisfactory | | | | | | | -0.306 | (-1.17) |
| Poor | | | | | | | -0.172 | (-0.45) |
| Bad | | | | | | | 0.00897 | (0.01) |
| **Rel. income in t-1** | | | -0.0435 | (-0.39) | | | 0.0733 | (0.48) |
| **Partner's rel. income in t-1** | | | | | | | 0.00601 | (0.04) |
| Constant | -2.742*** | (-6.03) | -2.981*** | (-6.44) | -2.581*** | (-3.80) | -3.101*** | (-4.45) |

Continuation of Table 25

| Dependent var. | Model 1 PHI | | Model 2 PHI | | Model 3 PHI | | Model 4 PHI | |
|---|---|---|---|---|---|---|---|---|
| **Age groups** | | | | | | | | |
| 18–19 | -0.520 | (-1.19) | -0.521 | (-1.18) | -3.187*** | (-11.33) | -3.229*** | (-11.66) |
| 25–29 | 0.412*** | (4.01) | 0.412*** | (4.00) | 0.441* | (1.79) | 0.441* | (1.79) |
| 30–34 | 0.535*** | (5.41) | 0.535*** | (5.40) | 0.655*** | (2.79) | 0.655*** | (2.79) |
| 35–39 | 0.600*** | (5.95) | 0.600*** | (5.95) | 0.691*** | (2.92) | 0.691*** | (2.92) |
| 40–44 | 0.540*** | (5.30) | 0.540*** | (5.30) | 0.604** | (2.55) | 0.605** | (2.55) |
| 45–49 | 0.619*** | (6.00) | 0.619*** | (6.00) | 0.641*** | (2.71) | 0.641*** | (2.71) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.512*** | (-4.38) | -0.511*** | (-4.38) | -0.862** | (-2.21) | -0.862** | (-2.21) |
| Single | -0.156*** | (-3.14) | -0.155*** | (-3.13) | -0.184** | (-2.42) | -0.184** | (-2.42) |
| Divorced | -0.145** | (-2.18) | -0.145** | (-2.18) | 0.0102 | (0.07) | 0.00994 | (0.07) |
| Widowed | 0.117 | (0.62) | 0.117 | (0.62) | 5.698*** | (23.59) | 5.837*** | (24.81) |
| **HH-members age 0-14 in t-1** | | | | | | | | |
| 1 child | 0.205*** | (4.25) | 0.204*** | (4.25) | 0.304*** | (4.65) | 0.303*** | (4.64) |
| 2 children | 0.0362 | (0.60) | 0.0369 | (0.61) | 0.0216 | (0.28) | 0.0215 | (0.28) |
| 3 children | 0.153 | (1.17) | 0.153 | (1.17) | 0.218 | (1.52) | 0.218 | (1.52) |
| 4+ children | -0.608* | (-1.92) | -0.608* | (-1.92) | -0.752*** | (-3.40) | -0.752*** | (-3.40) |
| **Migration background** | | | | | | | | |
| Direct | -0.0261 | (-0.31) | -0.0250 | (-0.30) | 0.115 | (1.14) | 0.115 | (1.14) |
| Indirect | -0.304*** | (-4.18) | -0.305*** | (-4.19) | -0.238** | (-2.07) | -0.238** | (-2.07) |
| **West Germany** | 0.105** | (2.36) | 0.105** | (2.36) | 0.109* | (1.74) | 0.110* | (1.74) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.457*** | (21.31) | 2.457*** | (21.32) | 2.803*** | (14.49) | 2.803*** | (14.48) |
| High-level | 2.353*** | (28.10) | 2.353*** | (28.20) | 2.337*** | (19.29) | 2.336*** | (19.29) |
| Executive | 2.198*** | (18.91) | 2.197*** | (18.86) | 2.206*** | (12.61) | 2.206*** | (12.60) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.497*** | (-2.62) | -0.495*** | (-2.61) |
| High-level | | | | | -0.281** | (-2.12) | -0.280** | (-2.11) |
| Executive | | | | | -0.0575 | (-0.32) | -0.0596 | (-0.33) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.0640 | (-1.17) | -0.0632 | (-1.15) | 0.108 | (1.35) | 0.111 | (1.40) |
| Satisfactory | -0.202*** | (-3.33) | -0.201*** | (-3.31) | -0.0211 | (-0.24) | -0.0176 | (-0.20) |
| Poor | -0.305*** | (-3.61) | -0.303*** | (-3.59) | -0.191 | (-1.48) | -0.188 | (-1.46) |
| Bad | -0.166 | (-0.81) | -0.168 | (-0.83) | -0.0704 | (-0.20) | -0.0720 | (-0.20) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | -0.0193 | (-0.23) | -0.0201 | (-0.24) |
| Satisfactory | | | | | 0.000645 | (0.01) | -0.00134 | (-0.01) |
| Poor | | | | | 0.0723 | (0.56) | 0.0713 | (0.55) |
| Bad | | | | | -0.00801 | (-0.02) | -0.00847 | (-0.02) |
| **Rel. income in t-1** | 0.390*** | (13.27) | 0.390*** | (13.27) | 0.348*** | (8.38) | 0.349*** | (8.38) |
| **Partner's rel. income in t-1** | | | | | -0.0577 | (-1.54) | -0.0576 | (-1.53) |
| **Partner in PHI** | | | | | 0.996*** | (16.33) | 0.996*** | (16.33) |
| Constant | -1.291*** | (-11.28) | -1.293*** | (-11.30) | -1.792*** | (-7.05) | -1.794*** | (-7.06) |
| athrho | | | | | | | | |
| Constant | 1.627*** | (8.25) | 1.435*** | (3.37) | 1.588*** | (8.42) | 1.567*** | (8.77) |
| lnsigma | | | | | | | | |
| Constant | -2.016** | (-2.17) | -4.204 | (-0.76) | -1.907** | (-2.07) | -2.072** | (-2.40) |
| AIC | 8141.893 | | 8152.021 | | 4426.208 | | 4446.876 | |
| BIC | 8495.608 | | 8560.155 | | 4835.735 | | 4955.682 | |
| Observations | 6649 | | 6649 | | 3659 | | 3659 | |

Table 26: Effect of Health insurance status on fertility in Logit estimations with RE

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | A birth occured during the period | | | | | | | |
| **Health insurance status** | | | | | | | | |
| $SHI_{Man}$ | -0.246** | (-2.56) | -0.285** | (-2.12) | -0.283** | (-2.44) | -0.363** | (-2.13) |
| $SHI_{Vol}$ | -0.198 | (-1.54) | -0.252 | (-1.62) | -0.315* | (-1.87) | -0.398* | (-1.95) |
| $SHI_{Fam}$ | -0.575*** | (-3.96) | -0.586*** | (-3.30) | -0.530*** | (-3.00) | -0.585*** | (-2.59) |
| $SHI_{Stu}$ | -0.0178 | (-0.10) | -0.0364 | (-0.17) | -0.246 | (-0.75) | -0.305 | (-0.86) |
| $PHI_{Fam}$ | -0.350 | (-1.12) | -0.357 | (-1.11) | 0.0382 | (0.09) | -0.0181 | (-0.04) |
| **Partner's health insurance status** | | | | | | | | |
| $SHI_{Man}$ | | | | | -0.0643 | (-0.64) | -0.0409 | (-0.34) |
| $SHI_{Vol}$ | | | | | -0.0774 | (-0.60) | -0.0261 | (-0.18) |
| $SHI_{Fam}$ | | | | | -0.650 | (-1.21) | -0.637 | (-1.17) |
| $SHI_{Stu}$ | | | | | -0.179 | (-0.55) | -0.164 | (-0.49) |
| $PHI_{Fam}$ | | | | | . | . | . | . |
| **Age groups** | | | | | | | | |
| 18–19 | -0.342 | (-0.91) | -0.313 | (-0.83) | 2.228** | (2.41) | 2.218** | (2.35) |
| 25–29 | 0.512*** | (4.57) | 0.499*** | (4.43) | 0.169 | (0.92) | 0.157 | (0.85) |
| 30–34 | 0.247** | (2.03) | 0.208* | (1.67) | -0.208 | (-1.09) | -0.222 | (-1.15) |
| 35–39 | -0.801*** | (-5.85) | -0.847*** | (-6.08) | -1.285*** | (-6.25) | -1.293*** | (-6.18) |
| 40–44 | -2.740*** | (-15.56) | -2.783*** | (-15.66) | -3.236*** | (-13.20) | -3.227*** | (-12.98) |
| 45–49 | -6.293*** | (-8.82) | -6.338*** | (-8.89) | -7.062*** | (-6.99) | -7.042*** | (-6.99) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.365* | (-1.74) | -0.361* | (-1.73) | -0.433 | (-0.61) | -0.432 | (-0.60) |
| Single | -1.456*** | (-17.39) | -1.450*** | (-17.37) | -0.927*** | (-8.19) | -0.934*** | (-8.21) |
| Divorced | -0.467*** | (-3.37) | -0.475*** | (-3.42) | -0.247 | (-0.98) | -0.254 | (-0.99) |
| Widowed | -0.101 | (-0.17) | -0.132 | (-0.23) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0519 | (-0.70) | -0.0313 | (-0.42) | -0.0644 | (-0.69) | -0.0495 | (-0.52) |
| 2 children | -0.964*** | (-8.38) | -0.927*** | (-7.93) | -1.057*** | (-7.78) | -1.040*** | (-7.48) |
| 3 children | -0.951*** | (-3.73) | -0.926*** | (-3.62) | -1.083*** | (-3.41) | -1.084*** | (-3.39) |
| 4+ children | 0.207 | (0.53) | 0.237 | (0.61) | 0.153 | (0.29) | 0.156 | (0.30) |
| **Migration background** | | | | | | | | |
| Direct | 0.133 | (1.41) | 0.141 | (1.49) | 0.0646 | (0.53) | 0.0539 | (0.44) |
| Indirect | 0.00474 | (0.04) | 0.00172 | (0.02) | 0.142 | (0.97) | 0.135 | (0.92) |
| **West Germany** | -0.170** | (-2.39) | -0.172** | (-2.39) | 0.0577 | (0.63) | 0.0842 | (0.89) |
| **Education** | | | | | | | | |
| Inadequately | -0.0379 | (-0.10) | -0.0603 | (-0.16) | 0.00618 | (0.01) | 0.0263 | (0.04) |
| Middle vocational | 0.184 | (1.63) | 0.189* | (1.65) | 0.139 | (0.95) | 0.142 | (0.93) |
| Vocational plus Abi | 0.180 | (1.34) | 0.177 | (1.31) | 0.165 | (0.94) | 0.160 | (0.89) |
| Higher vocational | 0.368*** | (2.67) | 0.374*** | (2.69) | 0.198 | (1.12) | 0.200 | (1.10) |
| Higher education | 0.552*** | (4.55) | 0.555*** | (4.46) | 0.543*** | (3.47) | 0.548*** | (3.32) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.151 | (-0.32) | -0.125 | (-0.27) |
| Middle vocational | | | | | -0.0107 | (-0.07) | 0.00522 | (0.03) |
| Vocational plus Abi | | | | | 0.309* | (1.68) | 0.318* | (1.71) |
| Higher vocational | | | | | 0.247 | (1.40) | 0.259 | (1.45) |
| Higher education | | | | | 0.285* | (1.80) | 0.298* | (1.78) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0187 | (0.08) | | | -0.128 | (-0.38) |
| High-level | | | -0.227 | (-0.98) | | | -0.234 | (-0.82) |
| Executive | | | -0.0280 | (-0.11) | | | -0.198 | (-0.66) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.0450 | (0.19) |
| High-level | | | | | | | 0.204 | (1.01) |
| Executive | | | | | | | 0.0823 | (0.25) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0905 | (1.07) | | | 0.0965 | (0.85) |
| Satisfactory | | | 0.0311 | (0.32) | | | -0.00617 | (-0.05) |
| Poor | | | 0.297** | (2.27) | | | -0.000365 | (-0.00) |
| Bad | | | 0.172 | (0.44) | | | -0.729 | (-0.98) |
| **Health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0659 | (0.60) |
| Satisfactory | | | | | | | -0.0882 | (-0.68) |
| Poor | | | | | | | -0.264 | (-1.23) |
| Bad | | | | | | | 0.302 | (0.61) |
| **Rel. income in t-1** | | | 0.117* | (1.84) | | | 0.0600 | (0.62) |
| **Partner's rel. income in t-1** | | | | | | | -0.0550 | (-0.78) |
| Constant | -1.863*** | (-9.69) | -1.952*** | (-8.40) | -1.605*** | (-5.39) | -1.621*** | (-4.43) |
| lnsig2u | | | | | | | | |
| Constant | -10.98 | (-0.00) | -10.98 | (-0.00) | -11.70 | (-0.00) | -11.72 | (-0.00) |
| AIC | 9584.585 | | 9591.053 | | 5417.567 | | 5437.727 | |
| BIC | 9832.917 | | 9907.89 | | 5711.286 | | 5858.46 | |
| Observations | 38683 | | 38683 | | 20710 | | 20710 | |

Table 27: Effect of health insurance status on fertility in Probit estimations with RE

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | A birth occured during the period | | | | | | | |
| **Health insurance status** | | | | | | | | |
| $\text{SHI}_{\text{Man}}$ | -0.111** | (-2.36) | -0.125* | (-1.91) | -0.138** | (-2.34) | -0.173** | (-2.04) |
| $\text{SHI}_{\text{Vol}}$ | -0.0844 | (-1.35) | -0.107 | (-1.42) | -0.156* | (-1.86) | -0.195* | (-1.94) |
| $\text{SHI}_{\text{Fam}}$ | -0.272*** | (-3.99) | -0.272*** | (-3.23) | -0.261*** | (-3.04) | -0.283*** | (-2.58) |
| $\text{SHI}_{\text{Stu}}$ | 0.00557 | (0.06) | 0.000693 | (0.01) | -0.0965 | (-0.59) | -0.122 | (-0.69) |
| $\text{PHI}_{\text{Fam}}$ | -0.174 | (-1.24) | -0.176 | (-1.21) | 0.00384 | (0.02) | -0.0122 | (-0.06) |
| **Partner's health insurance status** | | | | | | | | |
| $\text{SHI}_{\text{Man}}$ | | | | | -0.0412 | (-0.80) | -0.0344 | (-0.57) |
| $\text{SHI}_{\text{Vol}}$ | | | | | -0.0463 | (-0.72) | -0.0248 | (-0.36) |
| $\text{SHI}_{\text{Fam}}$ | | | | | -0.313 | (-1.22) | -0.306 | (-1.17) |
| $\text{SHI}_{\text{Stu}}$ | | | | | -0.0708 | (-0.43) | -0.0649 | (-0.39) |
| $\text{PHI}_{\text{Fam}}$ | | | | | . | . | . | . |
| **Age groups** | | | | | | | | |
| 18–19 | -0.103 | (-0.68) | -0.0872 | (-0.58) | 1.217** | (2.20) | 1.212** | (2.17) |
| 25–29 | 0.256*** | (5.07) | 0.252*** | (4.98) | 0.117 | (1.27) | 0.113 | (1.21) |
| 30–34 | 0.128** | (2.31) | 0.111** | (1.98) | -0.0919 | (-0.97) | -0.0990 | (-1.03) |
| 35–39 | -0.373*** | (-6.01) | -0.393*** | (-6.26) | -0.614*** | (-6.09) | -0.617*** | (-6.04) |
| 40–44 | -1.165*** | (-15.96) | -1.185*** | (-16.06) | -1.413*** | (-12.63) | -1.410*** | (-12.42) |
| 45–49 | -2.284*** | (-11.81) | -2.310*** | (-11.89) | -2.608*** | (-9.55) | -2.599*** | (-9.58) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.182* | (-1.83) | -0.186* | (-1.88) | -0.254 | (-0.75) | -0.257 | (-0.75) |
| Single | -0.674*** | (-16.50) | -0.672*** | (-16.47) | -0.436*** | (-7.58) | -0.437*** | (-7.57) |
| Divorced | -0.218*** | (-3.43) | -0.223*** | (-3.49) | -0.117 | (-0.98) | -0.116 | (-0.97) |
| Widowed | 0.0334 | (0.13) | 0.0211 | (0.08) | | | | |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.00584 | (-0.17) | 0.00417 | (0.12) | -0.0256 | (-0.56) | -0.0167 | (-0.36) |
| 2 children | -0.413*** | (-7.86) | -0.396*** | (-7.43) | -0.466*** | (-7.51) | -0.458*** | (-7.19) |
| 3 children | -0.389*** | (-3.40) | -0.379*** | (-3.30) | -0.433*** | (-3.08) | -0.433*** | (-3.05) |
| 4+ children | 0.131 | (0.71) | 0.149 | (0.80) | 0.125 | (0.51) | 0.121 | (0.50) |
| **Migration background** | | | | | | | | |
| Direct | 0.0586 | (1.26) | 0.0619 | (1.34) | 0.0245 | (0.40) | 0.0204 | (0.33) |
| Indirect | -0.00134 | (-0.03) | -0.00223 | (-0.04) | 0.0781 | (1.04) | 0.0775 | (1.03) |
| **West Germany** | -0.0763** | (-2.26) | -0.0781** | (-2.30) | 0.0579 | (1.30) | 0.0705 | (1.55) |
| **Education** | | | | | | | | |
| Inadequately | -0.0352 | (-0.22) | -0.0464 | (-0.28) | -0.0469 | (-0.17) | -0.0402 | (-0.14) |
| Middle vocational | 0.0812 | (1.57) | 0.0833 | (1.59) | 0.0724 | (1.03) | 0.0698 | (0.95) |
| Vocational plus Abi | 0.0871 | (1.40) | 0.0843 | (1.34) | 0.0980 | (1.15) | 0.0917 | (1.05) |
| Higher vocational | 0.169*** | (2.61) | 0.172*** | (2.63) | 0.0983 | (1.14) | 0.0978 | (1.11) |
| Higher education | 0.275*** | (4.83) | 0.274*** | (4.68) | 0.297*** | (3.87) | 0.295*** | (3.65) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.0295 | (-0.13) | -0.0132 | (-0.06) |
| Middle vocational | | | | | -0.00542 | (-0.07) | 0.000391 | (0.01) |
| Vocational plus Abi | | | | | 0.151 | (1.64) | 0.154* | (1.65) |
| Higher vocational | | | | | 0.112 | (1.29) | 0.119 | (1.36) |
| Higher education | | | | | 0.135* | (1.70) | 0.140* | (1.69) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.0101 | (0.09) | | | -0.0448 | (-0.27) |
| High-level | | | -0.119 | (-1.08) | | | -0.131 | (-0.93) |
| Executive | | | 0.0274 | (0.21) | | | -0.0464 | (-0.29) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.0389 | (0.32) |
| High-level | | | | | | | 0.0735 | (0.72) |
| Executive | | | | | | | 0.0118 | (0.07) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0509 | (1.26) | | | 0.0527 | (0.94) |
| Satisfactory | | | 0.0230 | (0.49) | | | -0.00304 | (-0.05) |
| Poor | | | 0.155** | (2.46) | | | 0.0127 | (0.14) |
| Bad | | | 0.110 | (0.62) | | | -0.328 | (-0.99) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0270 | (0.48) |
| Satisfactory | | | | | | | -0.0579 | (-0.91) |
| Poor | | | | | | | -0.132 | (-1.28) |
| Bad | | | | | | | 0.155 | (0.65) |
| **Rel. income in t-1** | | | 0.0587** | (2.10) | | | 0.0299 | (0.63) |
| **Partner's rel. income in t-1** | | | | | | | -0.0280 | (-0.83) |
| Constant | -1.146*** | (-12.71) | -1.201*** | (-10.89) | -1.031*** | (-7.07) | -1.032*** | (-5.73) |
| lnsig2u | | | | | | | | |
| Constant | -8.934 | (-0.06) | -9.356 | (-0.04) | -12.64 | (-0.00) | -12.70 | (-0.00) |
| AIC | 9609.374 | | 9614.047 | | 5424.565 | | 5443.99 | |
| BIC | 9857.706 | | 9930.884 | | 5718.284 | | 5864.724 | |
| Observations | 38683 | | 38683 | | 20710 | | 20710 | |

Table 28: Effect of the PHI on fertility in ET-models without civil servants

| Dependent var. | Model 1<br>No. of births | | Model 2<br>No. of births | | Model 3<br>No. of births | | Model 4<br>No. of births | |
|---|---|---|---|---|---|---|---|---|
| **PHI** | 0.346** | (2.42) | 0.200 | (1.61) | 0.562*** | (3.12) | 0.535*** | (3.07) |
| **Partner in PHI** | | | | | -0.0597 | (-0.60) | -0.0619 | (-0.61) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.374 | (-0.98) | -0.346 | (-0.91) | 1.835*** | (2.92) | 1.840*** | (2.86) |
| 25–29 | 0.511*** | (4.67) | 0.489*** | (4.44) | 0.191 | (1.15) | 0.179 | (1.07) |
| 30–34 | 0.237** | (2.02) | 0.190 | (1.59) | -0.164 | (-0.96) | -0.172 | (-0.99) |
| 35–39 | -0.733*** | (-5.49) | -0.784*** | (-5.78) | -1.144*** | (-6.08) | -1.142*** | (-5.95) |
| 40–44 | -2.655*** | (-14.98) | -2.699*** | (-15.10) | -3.106*** | (-13.07) | -3.086*** | (-12.80) |
| 45–49 | -6.092*** | (-8.58) | -6.141*** | (-8.62) | -6.777*** | (-6.70) | -6.744*** | (-6.67) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.347* | (-1.73) | -0.348* | (-1.74) | -0.458 | (-0.71) | -0.433 | (-0.68) |
| Single | -1.307*** | (-16.84) | -1.300*** | (-16.78) | -0.823*** | (-8.10) | -0.821*** | (-8.03) |
| Divorced | -0.332** | (-2.48) | -0.350*** | (-2.60) | -0.142 | (-0.60) | -0.151 | (-0.64) |
| Widowed | 0.110 | (0.20) | 0.0749 | (0.13) | -23.20*** | (-71.06) | -18.35*** | (-55.50) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0709 | (-0.97) | -0.0417 | (-0.57) | -0.0990 | (-1.09) | -0.0836 | (-0.90) |
| 2 children | -0.882*** | (-7.79) | -0.834*** | (-7.28) | -0.948*** | (-6.95) | -0.927*** | (-6.65) |
| 3 children | -0.915*** | (-3.79) | -0.871*** | (-3.61) | -1.057*** | (-3.54) | -1.051*** | (-3.49) |
| 4+ children | 0.0287 | (0.08) | 0.0494 | (0.13) | -0.109 | (-0.21) | -0.114 | (-0.22) |
| **Migration background** | | | | | | | | |
| Direct | 0.110 | (1.28) | 0.121 | (1.40) | | | 0.00529 | (0.05) |
| Indirect | 0.0174 | (0.18) | 0.0121 | (0.12) | | | 0.131 | (1.04) |
| **West Germany** | -0.179*** | (-2.68) | -0.180*** | (-2.67) | 0.0653 | (0.75) | 0.0725 | (0.80) |
| **Education** | | | | | | | | |
| Inadequately | -0.102 | (-0.28) | -0.115 | (-0.32) | -0.0318 | (-0.05) | -0.00971 | (-0.02) |
| Middle vocational | 0.222** | (2.04) | 0.219** | (2.01) | 0.166 | (1.16) | 0.172 | (1.19) |
| Vocational plus Abi | 0.232* | (1.81) | 0.221* | (1.72) | 0.172 | (1.05) | 0.179 | (1.08) |
| Higher vocational | 0.350** | (2.56) | 0.336** | (2.45) | 0.208 | (1.18) | 0.210 | (1.18) |
| Higher education | 0.601*** | (5.10) | 0.582*** | (4.89) | 0.560*** | (3.65) | 0.556*** | (3.57) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.0983 | (-0.24) | -0.106 | (-0.26) |
| Middle vocational | | | | | -0.00101 | (-0.01) | 0.00409 | (0.03) |
| Vocational plus Abi | | | | | 0.276 | (1.62) | 0.272 | (1.59) |
| Higher vocational | | | | | 0.240 | (1.41) | 0.246 | (1.44) |
| Higher education | | | | | 0.208 | (1.37) | 0.218 | (1.41) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0822 | (1.03) | | | 0.0563 | (0.54) |
| Satisfactory | | | 0.0212 | (0.23) | | | -0.0244 | (-0.20) |
| Poor | | | 0.292** | (2.39) | | | 0.0219 | (0.13) |
| Bad | | | 0.202 | (0.57) | | | -0.688 | (-0.98) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0573 | (0.56) |
| Satisfactory | | | | | | | -0.0879 | (-0.72) |
| Poor | | | | | | | -0.258 | (-1.32) |
| Bad | | | | | | | 0.352 | (0.80) |
| **Rel. income in t-1** | | | 0.145*** | (2.75) | | | 0.0383 | (0.47) |
| **Partner's rel. income in t-1** | | | | | | | -0.0162 | (-0.28) |
| Constant | -2.311*** | (-14.42) | -2.425*** | (-13.79) | -2.152*** | (-8.77) | -2.211*** | (-7.98) |

Continuation of Table 28

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.0827 | (0.74) | 0.0824 | (0.73) | -5.487*** | (-28.21) | -2.782*** | (-13.56) |
| 25–29 | -0.137** | (-2.46) | -0.137** | (-2.46) | 0.0365 | (0.19) | 0.0363 | (0.19) |
| 30–34 | -0.188*** | (-3.51) | -0.188*** | (-3.52) | 0.130 | (0.70) | 0.130 | (0.70) |
| 35–39 | -0.0998* | (-1.88) | -0.100* | (-1.89) | 0.193 | (1.05) | 0.193 | (1.04) |
| 40–44 | -0.0645 | (-1.23) | -0.0646 | (-1.23) | 0.213 | (1.16) | 0.213 | (1.15) |
| 45–49 | 0.0751 | (1.43) | 0.0751 | (1.43) | 0.336* | (1.82) | 0.335* | (1.82) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.293*** | (-3.43) | -0.293*** | (-3.43) | -0.270 | (-0.98) | -0.269 | (-0.98) |
| Single | 0.00739 | (0.24) | 0.00764 | (0.25) | -0.0629 | (-1.08) | -0.0629 | (-1.08) |
| Divorced | -0.191*** | (-4.50) | -0.190*** | (-4.49) | -0.0676 | (-0.74) | -0.0675 | (-0.74) |
| Widowed | -0.174 | (-1.45) | -0.174 | (-1.45) | 0.104 | (0.25) | 0.104 | (0.25) |
| **HH-members age 0-14 in t-1** | | | | | | | | |
| 1 child | 0.120*** | (4.10) | 0.120*** | (4.10) | 0.184*** | (4.36) | 0.184*** | (4.37) |
| 2 children | 0.213*** | (5.85) | 0.214*** | (5.86) | 0.248*** | (5.06) | 0.248*** | (5.06) |
| 3 children | 0.293*** | (3.92) | 0.293*** | (3.93) | 0.318*** | (3.55) | 0.318*** | (3.55) |
| 4+ children | 0.00628 | (0.02) | 0.00688 | (0.02) | -8.965*** | (-26.17) | -8.650*** | (-24.69) |
| **Migration background** | | | | | | | | |
| Direct | -0.323*** | (-7.46) | -0.323*** | (-7.47) | -0.137** | (-2.40) | -0.137** | (-2.41) |
| Indirect | -0.251*** | (-5.11) | -0.251*** | (-5.11) | -0.178** | (-2.18) | -0.179** | (-2.18) |
| **West Germany** | 0.234*** | (8.12) | 0.233*** | (8.12) | 0.205*** | (4.74) | 0.205*** | (4.74) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.0994*** | (-3.02) | -0.0997*** | (-3.03) | 0.0417 | (0.79) | 0.0415 | (0.79) |
| Satisfactory | -0.218*** | (-5.85) | -0.218*** | (-5.86) | -0.0887 | (-1.52) | -0.0888 | (-1.52) |
| Poor | -0.293*** | (-5.39) | -0.294*** | (-5.40) | -0.221** | (-2.56) | -0.221** | (-2.56) |
| Bad | -0.497*** | (-3.07) | -0.498*** | (-3.09) | -0.368 | (-1.55) | -0.368 | (-1.55) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | -0.0495 | (-0.91) | -0.0496 | (-0.91) |
| Satisfactory | | | | | -0.0608 | (-1.02) | -0.0605 | (-1.02) |
| Poor | | | | | -0.0515 | (-0.63) | -0.0509 | (-0.62) |
| Bad | | | | | -0.314 | (-1.41) | -0.315 | (-1.41) |
| **Rel. income in t-1** | 0.678*** | (25.21) | 0.678*** | (25.24) | 0.763*** | (21.87) | 0.763*** | (21.87) |
| **Partner's rel. income in t-1** | | | | | -0.00662 | (-0.36) | -0.00659 | (-0.35) |
| **Partner in PHI** | | | | | 1.114*** | (33.16) | 1.114*** | (33.16) |
| Constant | -2.030*** | (-32.87) | -2.029*** | (-32.88) | -2.854*** | (-14.15) | -2.854*** | (-14.14) |
| athrho | | | | | | | | |
| Constant | -1.427*** | (-22.54) | -1.140* | (-1.71) | -1.487*** | (-23.08) | -1.471*** | (-22.71) |
| lnsigma | | | | | | | | |
| Constant | -2.760*** | (-4.77) | -6.309 | (-0.57) | -2.404*** | (-4.35) | -2.547*** | (-4.48) |
| AIC | 23585.85 | | 23585.7 | | 12084.15 | | 12098.49 | |
| BIC | 24002.97 | | 24045.39 | | 12549.7 | | 12658.74 | |
| Observations | 36780 | | 36780 | | 19748 | | 19748 | |

Table 29: Effect of the PHI on fertility in RE-models without civil servants

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.227** | (2.02) | 0.197* | (1.75) | 0.398*** | (2.94) | 0.390*** | (2.86) |
| **Partner in PHI** | | | | | -0.0303 | (-0.31) | -0.0393 | (-0.40) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.374 | (-1.00) | -0.346 | (-0.93) | 1.852*** | (2.93) | 1.844*** | (2.85) |
| 25–29 | 0.510*** | (4.79) | 0.489*** | (4.56) | 0.192 | (1.19) | 0.177 | (1.09) |
| 30–34 | 0.238** | (2.04) | 0.190 | (1.60) | -0.157 | (-0.93) | -0.172 | (-1.00) |
| 35–39 | -0.731*** | (-5.54) | -0.784*** | (-5.85) | -1.132*** | (-6.09) | -1.141*** | (-6.02) |
| 40–44 | -2.653*** | (-15.07) | -2.699*** | (-15.21) | -3.092*** | (-13.12) | -3.083*** | (-12.90) |
| 45–49 | -6.089*** | (-8.55) | -6.141*** | (-8.62) | -6.761*** | (-6.68) | -6.739*** | (-6.68) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.350* | (-1.75) | -0.348* | (-1.75) | -0.444 | (-0.66) | -0.432 | (-0.64) |
| Single | -1.307*** | (-16.50) | -1.300*** | (-16.44) | -0.821*** | (-8.07) | -0.821*** | (-8.08) |
| Divorced | -0.333** | (-2.50) | -0.350*** | (-2.62) | -0.144 | (-0.59) | -0.155 | (-0.62) |
| Widowed | 0.109 | (0.20) | 0.0749 | (0.14) | -26.76*** | (-46.44) | -23.00*** | (-39.87) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0715 | (-1.03) | -0.0415 | (-0.59) | -0.0981 | (-1.12) | -0.0805 | (-0.90) |
| 2 children | -0.883*** | (-7.82) | -0.834*** | (-7.30) | -0.944*** | (-6.97) | -0.923*** | (-6.68) |
| 3 children | -0.915*** | (-3.74) | -0.871*** | (-3.55) | -1.050*** | (-3.43) | -1.045*** | (-3.38) |
| 4+ children | 0.0306 | (0.08) | 0.0498 | (0.13) | -0.120 | (-0.23) | -0.117 | (-0.22) |
| **Migration background** | | | | | | | | |
| Direct | 0.106 | (1.25) | 0.121 | (1.42) | 0.00802 | (0.07) | 0.00512 | (0.05) |
| Indirect | 0.0144 | (0.14) | 0.0120 | (0.12) | 0.135 | (1.03) | 0.130 | (0.99) |
| **West Germany** | -0.176*** | (-2.68) | -0.180*** | (-2.72) | 0.0602 | (0.73) | 0.0751 | (0.89) |
| **Education** | | | | | | | | |
| Inadequately | -0.103 | (-0.26) | -0.115 | (-0.29) | -0.0189 | (-0.03) | -0.00848 | (-0.02) |
| Middle vocational | 0.223** | (1.97) | 0.219* | (1.94) | 0.170 | (1.16) | 0.172 | (1.17) |
| Vocational plus Abi | 0.233* | (1.79) | 0.221* | (1.69) | 0.180 | (1.07) | 0.178 | (1.06) |
| Higher vocational | 0.352*** | (2.59) | 0.336** | (2.46) | 0.213 | (1.22) | 0.209 | (1.19) |
| Higher education | 0.604*** | (5.00) | 0.582*** | (4.78) | 0.567*** | (3.66) | 0.556*** | (3.55) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.121 | (-0.29) | -0.105 | (-0.25) |
| Middle vocational | | | | | -0.000274 | (-0.00) | 0.00474 | (0.03) |
| Vocational plus Abi | | | | | 0.277* | (1.65) | 0.272 | (1.62) |
| Higher vocational | | | | | 0.235 | (1.42) | 0.245 | (1.48) |
| Higher education | | | | | 0.214 | (1.44) | 0.219 | (1.44) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0821 | (1.04) | | | 0.0561 | (0.55) |
| Satisfactory | | | 0.0211 | (0.23) | | | -0.0255 | (-0.21) |
| Poor | | | 0.291** | (2.40) | | | 0.0188 | (0.11) |
| Bad | | | 0.202 | (0.57) | | | -0.691 | (-0.98) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0567 | (0.55) |
| Satisfactory | | | | | | | -0.0892 | (-0.75) |
| Poor | | | | | | | -0.258 | (-1.30) |
| Bad | | | | | | | 0.347 | (0.79) |
| **Rel. income in t-1** | | | 0.146*** | (2.85) | | | 0.0519 | (0.64) |
| **Partner's rel. income in t-1** | | | | | | | -0.0159 | (-0.28) |
| Constant | -2.306*** | (-14.10) | -2.425*** | (-13.57) | -2.168*** | (-8.53) | -2.215*** | (-7.64) |
| lnalpha | | | | | | | | |
| Constant | -16.28*** | (-22.84) | -14.34*** | (-6.20) | -15.37*** | (-11.21) | -14.54*** | (-7.91) |
| AIC | 9282.918 | | 9282.411 | | 5273.992 | | 5285.231 | |
| BIC | 9495.736 | | 9537.792 | | 5518.607 | | 5608.754 | |
| Observations | 36780 | | 36780 | | 19748 | | 19748 | |

Table 30: Effect of the PHI on fertility in ET-models under A1

| Dependent var. | Model 1 No. of births | | Model 2 No. of births | | Model 3 No. of births | | Model 4 No. of births | |
|---|---|---|---|---|---|---|---|---|
| **PHI** | 0.219* | (1.91) | 0.218 | (1.39) | 0.159 | (1.16) | 0.378* | (1.74) |
| **Partner in PHI** | | | | | 0.0564 | (0.59) | -0.0212 | (-0.19) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.568 | (-1.59) | -0.547 | (-1.53) | 0.926 | (1.39) | 0.936 | (1.40) |
| 25–29 | 0.407*** | (3.70) | 0.384*** | (3.47) | -0.0545 | (-0.34) | -0.0610 | (-0.38) |
| 30–34 | 0.184 | (1.56) | 0.133 | (1.10) | -0.270 | (-1.63) | -0.286* | (-1.71) |
| 35–39 | -0.838*** | (-6.28) | -0.894*** | (-6.60) | -1.301*** | (-7.09) | -1.316*** | (-7.04) |
| 40–44 | -2.842*** | (-14.63) | -2.894*** | (-14.75) | -3.308*** | (-13.09) | -3.313*** | (-12.93) |
| 45–49 | -6.543*** | (-6.51) | -6.594*** | (-6.56) | -6.607*** | (-6.55) | -6.603*** | (-6.54) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.420* | (-1.91) | -0.412* | (-1.88) | 0.121 | (0.19) | 0.117 | (0.18) |
| Single | -1.355*** | (-17.11) | -1.347*** | (-17.04) | -0.849*** | (-7.92) | -0.843*** | (-7.83) |
| Divorced | -0.460*** | (-3.21) | -0.479*** | (-3.33) | -0.172 | (-0.68) | -0.199 | (-0.77) |
| Widowed | -0.265 | (-0.38) | -0.294 | (-0.42) | -20.22*** | (-49.18) | -18.23*** | (-44.09) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0963 | (-1.28) | -0.0615 | (-0.81) | -0.118 | (-1.22) | -0.100 | (-1.02) |
| 2 children | -0.953*** | (-8.12) | -0.895*** | (-7.53) | -1.026*** | (-7.13) | -1.004*** | (-6.85) |
| 3 children | -0.983*** | (-3.84) | -0.926*** | (-3.62) | -1.189*** | (-3.66) | -1.187*** | (-3.63) |
| 4+ children | -0.101 | (-0.24) | -0.0886 | (-0.21) | -0.337 | (-0.57) | -0.347 | (-0.59) |
| **Migration background** | | | | | | | | |
| Direct | 0.0783 | (0.87) | 0.0917 | (1.01) | 0.0522 | (0.45) | 0.0540 | (0.46) |
| Indirect | 0.0485 | (0.48) | 0.0458 | (0.45) | 0.180 | (1.38) | 0.174 | (1.33) |
| **West Germany** | -0.159** | (-2.28) | -0.165** | (-2.34) | 0.0364 | (0.39) | 0.0376 | (0.39) |
| **Education** | | | | | | | | |
| Inadequately | -0.0692 | (-0.19) | -0.0754 | (-0.21) | 0.328 | (0.58) | 0.336 | (0.59) |
| Middle vocational | 0.128 | (1.17) | 0.115 | (1.05) | 0.100 | (0.69) | 0.0950 | (0.64) |
| Vocational plus Abi | 0.142 | (1.10) | 0.121 | (0.92) | 0.0899 | (0.53) | 0.0824 | (0.48) |
| Higher vocational | 0.285** | (2.10) | 0.260* | (1.91) | 0.139 | (0.79) | 0.117 | (0.65) |
| Higher education | 0.482*** | (4.12) | 0.454*** | (3.78) | 0.481*** | (3.12) | 0.475*** | (2.96) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.361 | (-0.74) | -0.331 | (-0.68) |
| Middle vocational | | | | | 0.0849 | (0.55) | 0.100 | (0.63) |
| Vocational plus Abi | | | | | 0.256 | (1.37) | 0.256 | (1.33) |
| Higher vocational | | | | | 0.336* | (1.85) | 0.341* | (1.85) |
| Higher education | | | | | 0.371** | (2.29) | 0.370** | (2.17) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | -0.0501 | (-0.20) | | | -0.317 | (-0.86) |
| High-level | | | -0.114 | (-0.54) | | | -0.244 | (-0.93) |
| Executive | | | 0.0229 | (0.09) | | | -0.368 | (-1.12) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.114 | (0.43) |
| High-level | | | | | | | 0.167 | (0.80) |
| Executive | | | | | | | 0.00540 | (0.02) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0614 | (0.75) | | | 0.0711 | (0.66) |
| Satisfactory | | | 0.0309 | (0.33) | | | 0.0299 | (0.24) |
| Poor | | | 0.207 | (1.62) | | | -0.0714 | (-0.39) |
| Bad | | | 0.199 | (0.55) | | | -1.264 | (-1.27) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0658 | (0.61) |
| Satisfactory | | | | | | | -0.0791 | (-0.62) |
| Poor | | | | | | | -0.248 | (-1.19) |
| Bad | | | | | | | 0.354 | (0.79) |
| **Rel. income in t-1** | | | 0.172*** | (2.96) | | | 0.0676 | (0.80) |
| **Partner's rel. income in t-1** | | | | | | | 0.0325 | (0.48) |
| Constant | -4.652*** | (-29.10) | -4.760*** | (-26.77) | -4.537*** | (-18.28) | -4.655*** | (-16.12) |

Continuation of Table 30

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.0606 | (0.81) | 0.0606 | (0.81) | -3.155*** | (-25.75) | -2.689*** | (-21.82) |
| 25–29 | -0.146*** | (-3.67) | -0.146*** | (-3.67) | 0.107 | (0.88) | 0.107 | (0.88) |
| 30–34 | -0.147*** | (-3.87) | -0.147*** | (-3.87) | 0.162 | (1.39) | 0.163 | (1.39) |
| 35–39 | -0.0770** | (-2.02) | -0.0770** | (-2.02) | 0.254** | (2.19) | 0.256** | (2.20) |
| 40–44 | -0.0271 | (-0.71) | -0.0270 | (-0.71) | 0.275** | (2.37) | 0.276** | (2.38) |
| 45–49 | 0.0860** | (2.22) | 0.0860** | (2.22) | 0.280** | (2.40) | 0.281** | (2.41) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.224*** | (-3.83) | -0.224*** | (-3.83) | -0.0417 | (-0.20) | -0.0429 | (-0.20) |
| Single | -0.0333 | (-1.51) | -0.0333 | (-1.51) | -0.116*** | (-2.71) | -0.116*** | (-2.71) |
| Divorced | -0.230*** | (-6.66) | -0.230*** | (-6.66) | 0.102 | (1.16) | 0.101 | (1.15) |
| Widowed | -0.0829 | (-0.89) | -0.0829 | (-0.89) | 0.787** | (2.57) | 0.787** | (2.57) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.140*** | (6.56) | 0.140*** | (6.56) | 0.148*** | (4.64) | 0.148*** | (4.63) |
| 2 children | 0.164*** | (6.03) | 0.164*** | (6.03) | 0.160*** | (4.31) | 0.160*** | (4.31) |
| 3 children | 0.201*** | (3.44) | 0.201*** | (3.44) | 0.189** | (2.55) | 0.189** | (2.55) |
| 4+ children | -0.0196 | (-0.09) | -0.0198 | (-0.09) | -2.021*** | (-4.11) | -2.016*** | (-4.09) |
| **Migration background** | | | | | | | | |
| Direct | -0.313*** | (-9.42) | -0.313*** | (-9.42) | -0.144*** | (-3.19) | -0.144*** | (-3.19) |
| Indirect | -0.250*** | (-7.38) | -0.250*** | (-7.38) | -0.254*** | (-4.20) | -0.255*** | (-4.21) |
| **West Germany** | 0.220*** | (10.15) | 0.220*** | (10.15) | 0.226*** | (6.55) | 0.226*** | (6.56) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.841*** | (50.69) | 2.841*** | (50.68) | 3.000*** | (33.81) | 3.001*** | (33.80) |
| High-level | 2.911*** | (62.87) | 2.911*** | (62.87) | 2.822*** | (36.36) | 2.822*** | (36.37) |
| Executive | 3.069*** | (37.94) | 3.069*** | (37.93) | 3.207*** | (21.65) | 3.206*** | (21.66) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.0789 | (-1.15) | -0.0791 | (-1.16) |
| High-level | | | | | 0.119** | (1.97) | 0.119** | (1.97) |
| Executive | | | | | 0.319*** | (3.58) | 0.319*** | (3.58) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.111*** | (-4.51) | -0.111*** | (-4.51) | -0.00595 | (-0.15) | -0.00564 | (-0.14) |
| Satisfactory | -0.217*** | (-7.91) | -0.217*** | (-7.91) | -0.127*** | (-2.92) | -0.126*** | (-2.91) |
| Poor | -0.268*** | (-6.92) | -0.268*** | (-6.92) | -0.228*** | (-3.58) | -0.228*** | (-3.58) |
| Bad | -0.468*** | (-4.88) | -0.468*** | (-4.88) | -0.291* | (-1.71) | -0.289* | (-1.70) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | -0.00356 | (-0.08) | -0.00395 | (-0.09) |
| Satisfactory | | | | | -0.0430 | (-0.93) | -0.0436 | (-0.94) |
| Poor | | | | | 0.00292 | (0.05) | 0.00252 | (0.04) |
| Bad | | | | | -0.415** | (-2.01) | -0.416** | (-2.02) |
| **Rel. income in t-1** | 0.671*** | (32.51) | 0.671*** | (32.53) | 0.710*** | (24.96) | 0.710*** | (24.95) |
| **Partner's rel. income in t-1** | | | | | -0.0236 | (-1.27) | -0.0236 | (-1.27) |
| **Partner in PHI** | | | | | 1.078*** | (37.23) | 1.078*** | (37.23) |
| Constant | -1.986*** | (-43.92) | -1.986*** | (-43.92) | -2.761*** | (-21.12) | -2.762*** | (-21.11) |
| athrho | | | | | | | | |
| Constant | -1.295*** | (-7.07) | -1.272*** | (-7.24) | 1.360*** | (6.10) | -1.437*** | (-13.55) |
| lnsigma | | | | | | | | |
| Constant | -3.569 | (-1.55) | -3.845* | (-1.67) | -3.759 | (-1.03) | -2.716** | (-2.33) |
| AIC | 36715.02 | | 36721.77 | | 17684.55 | | 17703.48 | |
| BIC | 37186.79 | | 37266.12 | | 18247 | | 18400.25 | |
| Observations | 64374 | | 64374 | | 32689 | | 32689 | |

Table 31: Effect of the PHI on fertility in RE-models under A1

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.190** | (2.28) | 0.180 | (1.62) | 0.182* | (1.76) | 0.261* | (1.80) |
| **Partner in PHI** | | | | | 0.0513 | (0.55) | -0.00223 | (-0.02) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.569 | (-1.62) | -0.547 | (-1.55) | 0.927 | (1.38) | 0.940 | (1.40) |
| 25–29 | 0.408*** | (3.88) | 0.383*** | (3.61) | -0.0548 | (-0.36) | -0.0622 | (-0.40) |
| 30–34 | 0.185 | (1.61) | 0.132 | (1.13) | -0.270* | (-1.69) | -0.286* | (-1.78) |
| 35–39 | -0.837*** | (-6.41) | -0.895*** | (-6.75) | -1.301*** | (-7.30) | -1.315*** | (-7.29) |
| 40–44 | -2.841*** | (-14.78) | -2.895*** | (-14.92) | -3.308*** | (-13.34) | -3.311*** | (-13.23) |
| 45–49 | -6.542*** | (-6.49) | -6.594*** | (-6.56) | -6.608*** | (-6.54) | -6.601*** | (-6.55) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.420** | (-1.97) | -0.413* | (-1.94) | 0.122 | (0.19) | 0.118 | (0.19) |
| Single | -1.356*** | (-17.02) | -1.347*** | (-16.96) | -0.848*** | (-8.10) | -0.844*** | (-8.07) |
| Divorced | -0.461*** | (-3.18) | -0.480*** | (-3.31) | -0.172 | (-0.62) | -0.199 | (-0.71) |
| Widowed | -0.261 | (-0.38) | -0.295 | (-0.43) | -21.85*** | (-26.09) | -25.23*** | (-30.22) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0965 | (-1.38) | -0.0607 | (-0.86) | -0.118 | (-1.32) | -0.0976 | (-1.07) |
| 2 children | -0.953*** | (-8.24) | -0.894*** | (-7.61) | -1.025*** | (-7.32) | -1.001*** | (-6.97) |
| 3 children | -0.984*** | (-3.80) | -0.924*** | (-3.55) | -1.189*** | (-3.57) | -1.182*** | (-3.53) |
| 4+ children | -0.101 | (-0.24) | -0.0852 | (-0.20) | -0.337 | (-0.55) | -0.348 | (-0.58) |
| **Migration background** | | | | | | | | |
| Direct | 0.0758 | (0.86) | 0.0907 | (1.03) | 0.0536 | (0.47) | 0.0535 | (0.47) |
| Indirect | 0.0464 | (0.45) | 0.0447 | (0.43) | 0.182 | (1.37) | 0.172 | (1.30) |
| **West Germany** | -0.157** | (-2.34) | -0.164** | (-2.42) | 0.0349 | (0.41) | 0.0404 | (0.47) |
| **Education** | | | | | | | | |
| Inadequately | -0.0707 | (-0.19) | -0.0754 | (-0.21) | 0.330 | (0.62) | 0.337 | (0.64) |
| Middle vocational | 0.125 | (1.13) | 0.115 | (1.03) | 0.103 | (0.72) | 0.0947 | (0.64) |
| Vocational plus Abi | 0.140 | (1.08) | 0.121 | (0.92) | 0.0924 | (0.55) | 0.0822 | (0.48) |
| Higher vocational | 0.284** | (2.15) | 0.260* | (1.94) | 0.141 | (0.83) | 0.117 | (0.67) |
| Higher education | 0.482*** | (4.15) | 0.454*** | (3.79) | 0.481*** | (3.23) | 0.474*** | (3.02) |
| **Partner's Education** | | | | | | | | |
| Inadequately | | | | | -0.360 | (-0.75) | -0.330 | (-0.68) |
| Middle vocational | | | | | 0.0844 | (0.56) | 0.101 | (0.65) |
| Vocational plus Abi | | | | | 0.255 | (1.41) | 0.256 | (1.38) |
| Higher vocational | | | | | 0.336* | (1.95) | 0.340* | (1.95) |
| Higher education | | | | | 0.370** | (2.41) | 0.371** | (2.26) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | -0.0188 | (-0.08) | | | -0.223 | (-0.67) |
| High-level | | | -0.0818 | (-0.40) | | | -0.154 | (-0.61) |
| Executive | | | 0.0555 | (0.25) | | | -0.274 | (-1.10) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.109 | (0.47) |
| High-level | | | | | | | 0.168 | (0.94) |
| Executive | | | | | | | 0.0109 | (0.04) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0609 | (0.76) | | | 0.0705 | (0.68) |
| Satisfactory | | | 0.0300 | (0.32) | | | 0.0284 | (0.23) |
| Poor | | | 0.206 | (1.64) | | | -0.0744 | (-0.41) |
| Bad | | | 0.198 | (0.55) | | | -1.267 | (-1.27) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0659 | (0.65) |
| Satisfactory | | | | | | | -0.0797 | (-0.66) |
| Poor | | | | | | | -0.247 | (-1.17) |
| Bad | | | | | | | 0.349 | (0.78) |
| **Rel. income in t-1** | | | 0.177*** | (3.25) | | | 0.0804 | (0.98) |
| **Partner's rel. income in t-1** | | | | | | | 0.0322 | (0.49) |
| Constant | -4.648*** | (-29.11) | -4.760*** | (-26.81) | -4.538*** | (-18.16) | -4.659*** | (-15.81) |
| lnalpha | | | | | | | | |
| Constant | -14.22*** | (-3.07) | -14.02*** | (-3.31) | -14.63*** | (-3.66) | -14.97*** | (-4.04) |
| AIC | 10238.6 | | 10245.25 | | 5775.757 | | 5794.795 | |
| BIC | 10465.41 | | 10544.64 | | 6035.995 | | 6189.35 | |
| Observations | 64374 | | 64374 | | 32689 | | 32689 | |

Table 32: Effect of the PHI on fertility in ET-models under A2

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.369*** | (3.19) | -0.00472 | (-0.03) | 0.371*** | (2.63) | 0.200 | (0.86) |
| **Partner in PHI** | | | | | 0.00126 | (0.01) | -0.0111 | (-0.09) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.401 | (-1.11) | -0.390 | (-1.08) | 1.163* | (1.76) | 1.178* | (1.77) |
| 25–29 | 0.449*** | (4.01) | 0.426*** | (3.79) | -0.00562 | (-0.03) | -0.0221 | (-0.13) |
| 30–34 | 0.253** | (2.13) | 0.211* | (1.74) | -0.232 | (-1.34) | -0.247 | (-1.41) |
| 35–39 | -0.756*** | (-5.60) | -0.798*** | (-5.83) | -1.231*** | (-6.40) | -1.240*** | (-6.38) |
| 40–44 | -2.652*** | (-13.78) | -2.684*** | (-13.81) | -3.155*** | (-12.21) | -3.144*** | (-12.04) |
| 45–49 | -6.426*** | (-6.39) | -6.449*** | (-6.41) | -6.478*** | (-6.41) | -6.459*** | (-6.38) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.205 | (-0.98) | -0.206 | (-0.98) | 0.322 | (0.50) | 0.320 | (0.50) |
| Single | -1.189*** | (-15.36) | -1.179*** | (-15.25) | -0.623*** | (-6.01) | -0.626*** | (-6.00) |
| Divorced | -0.474*** | (-3.14) | -0.493*** | (-3.27) | -0.309 | (-1.08) | -0.330 | (-1.15) |
| Widowed | -0.208 | (-0.30) | -0.218 | (-0.31) | -19.83*** | (-49.36) | -17.07*** | (-42.47) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0897 | (-1.18) | -0.0558 | (-0.73) | -0.112 | (-1.11) | -0.0975 | (-0.96) |
| 2 children | -1.016*** | (-8.28) | -0.964*** | (-7.76) | -1.064*** | (-7.06) | -1.056*** | (-6.86) |
| 3 children | -1.116*** | (-3.95) | -1.069*** | (-3.78) | -1.311*** | (-3.62) | -1.323*** | (-3.64) |
| 4+ children | 0.108 | (0.28) | 0.116 | (0.30) | 0.0657 | (0.13) | 0.0306 | (0.06) |
| **Migration background** | | | | | | | | |
| Direct | 0.0841 | (0.90) | 0.0874 | (0.93) | 0.122 | (1.03) | 0.130 | (1.08) |
| Indirect | 0.0445 | (0.43) | 0.0375 | (0.37) | 0.225* | (1.70) | 0.217 | (1.63) |
| **West Germany** | -0.145** | (-2.05) | -0.145** | (-2.04) | 0.0494 | (0.51) | 0.0501 | (0.51) |
| **Education** | | | | | | | | |
| Inadequately | 0.161 | (0.46) | 0.173 | (0.50) | 0.505 | (0.89) | 0.516 | (0.91) |
| Middle vocational | 0.205* | (1.83) | 0.186 | (1.64) | 0.224 | (1.44) | 0.213 | (1.35) |
| Vocational plus Abi | 0.209 | (1.56) | 0.182 | (1.35) | 0.235 | (1.31) | 0.224 | (1.24) |
| Higher vocational | 0.368*** | (2.65) | 0.332** | (2.38) | 0.286 | (1.54) | 0.251 | (1.33) |
| Higher education | 0.542*** | (4.50) | 0.493*** | (3.98) | 0.583*** | (3.54) | 0.555*** | (3.25) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.793 | (-1.31) | -0.753 | (-1.24) |
| Middle vocational | | | | | 0.0757 | (0.48) | 0.101 | (0.62) |
| Vocational plus Abi | | | | | 0.197 | (1.01) | 0.219 | (1.10) |
| Higher vocational | | | | | 0.365** | (1.96) | 0.392** | (2.09) |
| Higher education | | | | | 0.410** | (2.44) | 0.436** | (2.50) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.178 | (0.71) | | | -0.0567 | (-0.15) |
| High-level | | | 0.322 | (1.60) | | | 0.232 | (0.91) |
| Executive | | | 0.487** | (2.00) | | | 0.141 | (0.46) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.143 | (0.55) |
| High-level | | | | | | | 0.128 | (0.61) |
| Executive | | | | | | | -0.0870 | (-0.25) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.105 | (1.25) | | | 0.140 | (1.25) |
| Satisfactory | | | -0.00585 | (-0.06) | | | -0.00612 | (-0.05) |
| Poor | | | 0.131 | (0.98) | | | -0.0300 | (-0.16) |
| Bad | | | 0.351 | (1.03) | | | -1.141 | (-1.14) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0435 | (0.38) |
| Satisfactory | | | | | | | -0.0974 | (-0.73) |
| Poor | | | | | | | -0.119 | (-0.58) |
| Bad | | | | | | | 0.588 | (1.42) |
| **Rel. income in t-1** | | | 0.165*** | (2.87) | | | 0.0446 | (0.52) |
| **Partner's rel. income in t-1** | | | | | | | 0.0177 | (0.27) |
| Constant | -4.860*** | (-29.73) | -4.947*** | (-27.69) | -4.798*** | (-18.78) | -4.904*** | (-16.76) |

Continuation of Table 32

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.119 | (1.51) | 0.119 | (1.51) | -2.972*** | (-23.84) | -2.800*** | (-22.38) |
| 25–29 | -0.123*** | (-3.01) | -0.122*** | (-2.99) | 0.00209 | (0.02) | 0.00236 | (0.02) |
| 30–34 | -0.123*** | (-3.15) | -0.123*** | (-3.16) | 0.0770 | (0.65) | 0.0764 | (0.64) |
| 35–39 | -0.0368 | (-0.94) | -0.0375 | (-0.96) | 0.208* | (1.76) | 0.206* | (1.75) |
| 40–44 | -0.00623 | (-0.16) | -0.00645 | (-0.16) | 0.185 | (1.57) | 0.184 | (1.56) |
| 45–49 | 0.118*** | (2.97) | 0.118*** | (2.97) | 0.223* | (1.88) | 0.222* | (1.88) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.216*** | (-3.59) | -0.217*** | (-3.60) | -0.190 | (-0.79) | -0.189 | (-0.79) |
| Single | -0.00858 | (-0.38) | -0.00834 | (-0.37) | -0.112** | (-2.54) | -0.112** | (-2.55) |
| Divorced | -0.231*** | (-6.59) | -0.230*** | (-6.57) | 0.0283 | (0.31) | 0.0288 | (0.31) |
| Widowed | -0.0246 | (-0.27) | -0.0246 | (-0.27) | 0.833*** | (2.67) | 0.833*** | (2.67) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.137*** | (6.35) | 0.137*** | (6.37) | 0.147*** | (4.46) | 0.147*** | (4.47) |
| 2 children | 0.162*** | (5.89) | 0.163*** | (5.91) | 0.156*** | (4.08) | 0.156*** | (4.08) |
| 3 children | 0.176*** | (2.88) | 0.176*** | (2.89) | 0.225*** | (2.97) | 0.225*** | (2.98) |
| 4+ children | -0.151 | (-0.63) | -0.152 | (-0.64) | -2.173*** | (-5.10) | -2.176*** | (-5.10) |
| **Migration background** | | | | | | | | |
| Direct | -0.350*** | (-10.03) | -0.350*** | (-10.04) | -0.214*** | (-4.37) | -0.214*** | (-4.37) |
| Indirect | -0.223*** | (-6.56) | -0.223*** | (-6.55) | -0.232*** | (-3.84) | -0.232*** | (-3.83) |
| **West Germany** | 0.229*** | (10.41) | 0.229*** | (10.39) | 0.215*** | (6.10) | 0.215*** | (6.09) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.862*** | (50.99) | 2.863*** | (50.97) | 3.082*** | (34.63) | 3.082*** | (34.62) |
| High-level | 2.908*** | (61.94) | 2.908*** | (61.93) | 2.837*** | (35.83) | 2.836*** | (35.81) |
| Executive | 3.041*** | (38.61) | 3.041*** | (38.63) | 3.229*** | (21.63) | 3.230*** | (21.60) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.131* | (-1.84) | -0.131* | (-1.84) |
| High-level | | | | | 0.0867 | (1.42) | 0.0866 | (1.42) |
| Executive | | | | | 0.275*** | (2.87) | 0.275*** | (2.87) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.120*** | (-4.82) | -0.120*** | (-4.84) | -0.0175 | (-0.43) | -0.0182 | (-0.45) |
| Satisfactory | -0.236*** | (-8.46) | -0.236*** | (-8.46) | -0.143*** | (-3.21) | -0.143*** | (-3.21) |
| Poor | -0.273*** | (-6.96) | -0.273*** | (-6.97) | -0.245*** | (-3.63) | -0.245*** | (-3.63) |
| Bad | -0.444*** | (-4.51) | -0.447*** | (-4.55) | -0.252 | (-1.41) | -0.253 | (-1.42) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | -0.00552 | (-0.13) | -0.00516 | (-0.12) |
| Satisfactory | | | | | -0.0555 | (-1.17) | -0.0547 | (-1.15) |
| Poor | | | | | 0.00682 | (0.11) | 0.00737 | (0.11) |
| Bad | | | | | -0.508** | (-2.16) | -0.508** | (-2.16) |
| **Rel. income in t-1** | 0.664*** | (31.90) | 0.664*** | (31.96) | 0.719*** | (24.52) | 0.719*** | (24.53) |
| **Partner's rel. income in t-1** | | | | | -0.0309 | (-1.55) | -0.0310 | (-1.56) |
| **Partner in PHI** | | | | | 1.094*** | (36.69) | 1.094*** | (36.69) |
| Constant | -2.016*** | (-43.41) | -2.015*** | (-43.43) | -2.673*** | (-20.13) | -2.672*** | (-20.13) |
| athrho | | | | | | | | |
| Constant | -1.464*** | (-33.13) | -1.210*** | (-3.96) | -1.521*** | (-22.47) | -1.462*** | (-16.31) |
| lnsigma | | | | | | | | |
| Constant | -1.728*** | (-4.84) | -4.636 | (-0.90) | -1.813*** | (-3.48) | -2.391*** | (-2.71) |
| AIC | 35635.76 | | 35642.06 | | 16702.67 | | 16721.83 | |
| BIC | 36106.16 | | 36184.82 | | 17262.33 | | 17415.14 | |
| Observations | 62701 | | 62701 | | 31354 | | 31354 | |

Table 33: Effect of the PHI on fertility in RE-models under A2

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | No. of births | | No. of births | | No. of births | | No. of births | |
| **PHI** | 0.183** | (2.18) | -0.0217 | (-0.18) | 0.211** | (2.00) | 0.0386 | (0.24) |
| **Partner in PHI** | | | | | 0.0354 | (0.36) | 0.0141 | (0.12) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.413 | (-1.16) | -0.390 | (-1.10) | 1.153* | (1.72) | 1.182* | (1.75) |
| 25–29 | 0.453*** | (4.20) | 0.425*** | (3.92) | -0.00381 | (-0.02) | -0.0243 | (-0.15) |
| 30–34 | 0.259** | (2.22) | 0.211* | (1.78) | -0.229 | (-1.37) | -0.248 | (-1.47) |
| 35–39 | -0.751*** | (-5.67) | -0.798*** | (-5.94) | -1.228*** | (-6.60) | -1.239*** | (-6.60) |
| 40–44 | -2.648*** | (-13.91) | -2.684*** | (-13.97) | -3.154*** | (-12.47) | -3.142*** | (-12.31) |
| 45–49 | -6.418*** | (-6.37) | -6.449*** | (-6.41) | -6.473*** | (-6.40) | -6.456*** | (-6.40) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.208 | (-1.03) | -0.207 | (-1.02) | 0.318 | (0.50) | 0.320 | (0.51) |
| Single | -1.191*** | (-15.43) | -1.179*** | (-15.29) | -0.628*** | (-6.28) | -0.628*** | (-6.24) |
| Divorced | -0.474*** | (-3.17) | -0.493*** | (-3.31) | -0.313 | (-1.04) | -0.332 | (-1.10) |
| Widowed | -0.181 | (-0.26) | -0.218 | (-0.32) | -21.94*** | (-26.47) | -34.08*** | (-41.58) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | -0.0905 | (-1.28) | -0.0555 | (-0.78) | -0.113 | (-1.22) | -0.0942 | (-1.00) |
| 2 children | -1.020*** | (-8.44) | -0.964*** | (-7.85) | -1.068*** | (-7.25) | -1.052*** | (-6.93) |
| 3 children | -1.121*** | (-3.94) | -1.068*** | (-3.74) | -1.315*** | (-3.57) | -1.317*** | (-3.56) |
| 4+ children | 0.110 | (0.28) | 0.118 | (0.30) | 0.0600 | (0.11) | 0.0259 | (0.05) |
| **Migration background** | | | | | | | | |
| Direct | 0.0676 | (0.74) | 0.0869 | (0.95) | 0.111 | (0.97) | 0.128 | (1.10) |
| Indirect | 0.0325 | (0.31) | 0.0370 | (0.36) | 0.213 | (1.60) | 0.214 | (1.61) |
| **West Germany** | -0.133* | (-1.94) | -0.144** | (-2.09) | 0.0579 | (0.65) | 0.0535 | (0.59) |
| **Education** | | | | | | | | |
| Inadequately | 0.150 | (0.44) | 0.173 | (0.51) | 0.502 | (0.97) | 0.518 | (1.00) |
| Middle vocational | 0.189* | (1.69) | 0.185 | (1.64) | 0.206 | (1.39) | 0.212 | (1.38) |
| Vocational plus Abi | 0.192 | (1.46) | 0.182 | (1.37) | 0.214 | (1.23) | 0.223 | (1.26) |
| Higher vocational | 0.361*** | (2.67) | 0.332** | (2.44) | 0.276 | (1.57) | 0.250 | (1.39) |
| Higher education | 0.545*** | (4.62) | 0.492*** | (4.05) | 0.580*** | (3.71) | 0.554*** | (3.38) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.798 | (-1.41) | -0.751 | (-1.34) |
| Middle vocational | | | | | 0.0776 | (0.51) | 0.102 | (0.66) |
| Vocational plus Abi | | | | | 0.203 | (1.11) | 0.220 | (1.18) |
| Higher vocational | | | | | 0.363** | (2.10) | 0.391** | (2.25) |
| Higher education | | | | | 0.412*** | (2.65) | 0.437*** | (2.66) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | 0.192 | (0.85) | | | 0.0741 | (0.22) |
| High-level | | | 0.336* | (1.78) | | | 0.356 | (1.49) |
| Executive | | | 0.501** | (2.50) | | | 0.271 | (1.13) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.137 | (0.58) |
| High-level | | | | | | | 0.129 | (0.70) |
| Executive | | | | | | | -0.0815 | (-0.25) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.104 | (1.29) | | | 0.139 | (1.29) |
| Satisfactory | | | -0.00626 | (-0.07) | | | -0.00803 | (-0.06) |
| Poor | | | 0.130 | (1.01) | | | -0.0340 | (-0.19) |
| Bad | | | 0.351 | (1.04) | | | -1.144 | (-1.14) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | 0.0440 | (0.41) |
| Satisfactory | | | | | | | -0.0981 | (-0.78) |
| Poor | | | | | | | -0.118 | (-0.59) |
| Bad | | | | | | | 0.580 | (1.45) |
| **Rel. income in t-1** | | | 0.167*** | (3.09) | | | 0.0611 | (0.73) |
| **Partner's rel. income in t-1** | | | | | | | 0.0171 | (0.26) |
| Constant | -4.828*** | (-29.87) | -4.947*** | (-27.84) | -4.772*** | (-19.40) | -4.907*** | (-17.21) |
| lnalpha | | | | | | | | |
| Constant | -14.63*** | (-3.20) | -15.37*** | (-3.08) | -14.65*** | (-4.43) | -15.42*** | (-5.51) |
| AIC | 9943.386 | | 9944.877 | | 5471.768 | | 5488.864 | |
| BIC | 10169.54 | | 10243.4 | | 5730.714 | | 5881.46 | |
| Observations | 62701 | | 62701 | | 31354 | | 31354 | |

Table 34: Effect of the PHI on fertility in ET models with PW

| Dependent var. | Model 1<br>No. of births | | Model 2<br>No. of births | | Model 3<br>No. of births | | Model 4<br>No. of births | |
|---|---|---|---|---|---|---|---|---|
| **PHI** | 0.146 | (0.87) | 0.147 | (0.79) | 0.0705 | (0.34) | 0.470* | (1.80) |
| **Partner in PHI** | | | | | -0.00965 | (-0.07) | -0.146 | (-0.86) |
| **Age groups** | | | | | | | | |
| 18–19 | -0.361 | (-0.81) | -0.341 | (-0.76) | 1.941*** | (3.07) | 1.951*** | (3.09) |
| 25–29 | 0.588*** | (3.27) | 0.573*** | (3.19) | 0.374 | (1.52) | 0.398 | (1.56) |
| 30–34 | 0.300 | (1.61) | 0.261 | (1.39) | -0.0763 | (-0.31) | -0.0403 | (-0.16) |
| 35–39 | -0.591*** | (-2.88) | -0.636*** | (-3.08) | -0.990*** | (-3.74) | -0.965*** | (-3.55) |
| 40–44 | -2.499*** | (-9.42) | -2.534*** | (-9.43) | -3.171*** | (-9.27) | -3.140*** | (-8.87) |
| 45–49 | -7.320*** | (-8.22) | -7.345*** | (-8.23) | -9.112*** | (-8.87) | -9.060*** | (-8.78) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.238 | (-0.65) | -0.238 | (-0.66) | -1.060 | (-1.43) | -1.130 | (-1.51) |
| Single | -1.343*** | (-11.67) | -1.336*** | (-11.67) | -0.670*** | (-4.53) | -0.673*** | (-4.66) |
| Divorced | -0.255 | (-1.45) | -0.279 | (-1.57) | -0.0840 | (-0.27) | -0.110 | (-0.37) |
| Widowed | -1.100* | (-1.76) | -1.118* | (-1.79) | -31.49*** | (-75.67) | -31.17*** | (-74.28) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.00656 | (0.06) | 0.0374 | (0.34) | -0.0319 | (-0.24) | -0.0162 | (-0.13) |
| 2 children | -0.688*** | (-3.74) | -0.635*** | (-3.43) | -0.576** | (-2.46) | -0.568** | (-2.52) |
| 3 children | -1.052*** | (-3.69) | -1.006*** | (-3.52) | -1.236*** | (-3.47) | -1.240*** | (-3.46) |
| 4+ children | 0.00891 | (0.02) | 0.0241 | (0.05) | 0.221 | (0.37) | 0.247 | (0.42) |
| **Migration background** | | | | | | | | |
| Direct | 0.0801 | (0.64) | 0.0959 | (0.76) | -0.214 | (-1.34) | -0.220 | (-1.35) |
| Indirect | 0.0406 | (0.23) | 0.0454 | (0.26) | 0.154 | (0.62) | 0.139 | (0.57) |
| **West Germany** | -0.202** | (-2.01) | -0.204** | (-2.03) | 0.189 | (1.43) | 0.177 | (1.29) |
| **Education** | | | | | | | | |
| Inadequately | -0.429 | (-0.96) | -0.434 | (-0.97) | -0.508 | (-0.79) | -0.542 | (-0.84) |
| Middle vocational | 0.0486 | (0.26) | 0.0388 | (0.20) | -0.165 | (-0.67) | -0.263 | (-1.09) |
| Vocational plus Abi | 0.116 | (0.55) | 0.0922 | (0.43) | -0.0890 | (-0.32) | -0.179 | (-0.66) |
| Higher vocational | 0.246 | (1.12) | 0.221 | (0.97) | -0.0799 | (-0.28) | -0.201 | (-0.72) |
| Higher education | 0.414** | (2.13) | 0.381* | (1.84) | 0.259 | (1.09) | 0.121 | (0.49) |
| **Partner's education** | | | | | | | | |
| Inadequately | | | | | -0.0441 | (-0.07) | -0.00920 | (-0.02) |
| Middle vocational | | | | | -0.354 | (-1.60) | -0.314 | (-1.36) |
| Vocational plus Abi | | | | | -0.0774 | (-0.31) | -0.0358 | (-0.14) |
| Higher vocational | | | | | -0.203 | (-0.79) | -0.127 | (-0.51) |
| Higher education | | | | | -0.140 | (-0.63) | -0.0951 | (-0.39) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | | | -0.0264 | (-0.07) | | | -0.845* | (-1.66) |
| High-level | | | -0.185 | (-0.64) | | | -0.157 | (-0.46) |
| Executive | | | 0.109 | (0.29) | | | -0.580 | (-1.18) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | | | 0.262 | (0.74) |
| High-level | | | | | | | -0.0305 | (-0.11) |
| Executive | | | | | | | 0.339 | (0.72) |
| **Health status in t-1** | | | | | | | | |
| Good | | | 0.0833 | (0.63) | | | 0.176 | (1.00) |
| Satisfactory | | | -0.0375 | (-0.25) | | | 0.0429 | (0.22) |
| Poor | | | 0.127 | (0.64) | | | -0.0529 | (-0.18) |
| Bad | | | 0.146 | (0.21) | | | 0.369 | (0.44) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | | | -0.206 | (-1.30) |
| Satisfactory | | | | | | | -0.214 | (-1.16) |
| Poor | | | | | | | -0.483* | (-1.76) |
| Bad | | | | | | | -0.0355 | (-0.06) |
| **Rel. income in t-1** | | | 0.162** | (2.06) | | | 0.0633 | (0.50) |
| **Partner's rel. income in t-1** | | | | | | | -0.0110 | (-0.08) |
| Constant | -2.258*** | (-9.46) | -2.357*** | (-8.13) | -1.797*** | (-4.90) | -1.697*** | (-3.52) |

Continuation of Table 34

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| Dependent var. | PHI | | PHI | | PHI | | PHI | |
| **Age groups** | | | | | | | | |
| 18–19 | 0.0634 | (0.44) | 0.0634 | (0.44) | -3.065*** | (-14.53) | -3.102*** | (-15.10) |
| 25–29 | -0.0615 | (-0.73) | -0.0615 | (-0.73) | 0.255 | (1.25) | 0.258 | (1.27) |
| 30–34 | -0.104 | (-1.25) | -0.104 | (-1.25) | 0.328 | (1.64) | 0.335* | (1.66) |
| 35–39 | -0.0904 | (-1.05) | -0.0905 | (-1.05) | 0.368* | (1.85) | 0.377* | (1.89) |
| 40–44 | -0.0597 | (-0.68) | -0.0597 | (-0.68) | 0.386* | (1.94) | 0.394** | (1.97) |
| 45–49 | 0.0795 | (0.90) | 0.0794 | (0.90) | 0.458** | (2.31) | 0.466** | (2.34) |
| **Marital status** | | | | | | | | |
| Married, separated | -0.368** | (-2.42) | -0.368** | (-2.42) | -0.455 | (-1.58) | -0.458 | (-1.59) |
| Single | -0.108** | (-2.42) | -0.108** | (-2.43) | -0.0586 | (-0.76) | -0.0567 | (-0.73) |
| Divorced | -0.186*** | (-3.29) | -0.186*** | (-3.29) | -0.301* | (-1.95) | -0.303* | (-1.96) |
| Widowed | -0.0883 | (-0.52) | -0.0883 | (-0.52) | -0.338 | (-0.95) | -0.338 | (-0.95) |
| **HH-members age 0–14 in t-1** | | | | | | | | |
| 1 child | 0.0881** | (2.11) | 0.0881** | (2.11) | 0.128** | (2.25) | 0.127** | (2.23) |
| 2 children | 0.143*** | (3.01) | 0.143*** | (3.01) | 0.160** | (2.51) | 0.160** | (2.50) |
| 3 children | 0.125 | (1.23) | 0.125 | (1.23) | 0.0638 | (0.43) | 0.0627 | (0.42) |
| 4+ children | 0.358 | (1.39) | 0.358 | (1.39) | -1.693*** | (-3.31) | -1.691*** | (-3.29) |
| **Migration background** | | | | | | | | |
| Direct | -0.328*** | (-5.18) | -0.328*** | (-5.18) | -0.281*** | (-3.35) | -0.280*** | (-3.35) |
| Indirect | -0.254*** | (-4.39) | -0.254*** | (-4.39) | -0.0724 | (-0.72) | -0.0725 | (-0.72) |
| **West Germany** | 0.269*** | (6.97) | 0.269*** | (6.97) | 0.245*** | (4.04) | 0.244*** | (4.01) |
| **Civil servant** | | | | | | | | |
| Low/middle-level | 2.836*** | (26.68) | 2.836*** | (26.68) | 3.105*** | (19.82) | 3.104*** | (19.81) |
| High-level | 3.070*** | (29.85) | 3.070*** | (29.82) | 3.009*** | (23.65) | 3.008*** | (23.69) |
| Executive | 3.064*** | (19.07) | 3.064*** | (19.07) | 3.239*** | (16.03) | 3.236*** | (16.02) |
| **Partner is civil servant** | | | | | | | | |
| Low/middle-level | | | | | -0.0196 | (-0.14) | -0.0206 | (-0.14) |
| High-level | | | | | -0.0600 | (-0.57) | -0.0608 | (-0.57) |
| Executive | | | | | 0.0559 | (0.37) | 0.0567 | (0.38) |
| **Health status in t-1** | | | | | | | | |
| Good | -0.107** | (-2.32) | -0.107** | (-2.32) | 0.0752 | (1.04) | 0.0774 | (1.07) |
| Satisfactory | -0.160*** | (-2.97) | -0.160*** | (-2.97) | -0.00714 | (-0.09) | -0.00611 | (-0.08) |
| Poor | -0.337*** | (-4.68) | -0.337*** | (-4.68) | -0.294** | (-2.37) | -0.293** | (-2.36) |
| Bad | -0.539*** | (-2.98) | -0.539*** | (-2.98) | -0.754** | (-2.26) | -0.753** | (-2.26) |
| **Partner's health status in t-1** | | | | | | | | |
| Good | | | | | -0.0344 | (-0.45) | -0.0362 | (-0.48) |
| Satisfactory | | | | | -0.136* | (-1.67) | -0.139* | (-1.70) |
| Poor | | | | | 0.0160 | (0.13) | 0.0145 | (0.12) |
| Bad | | | | | -0.686** | (-2.41) | -0.691** | (-2.42) |
| **Rel. income in t-1** | 0.670*** | (16.58) | 0.670*** | (16.58) | 0.683*** | (14.69) | 0.684*** | (14.67) |
| **Partner's rel. income in t-1** | | | | | 0.0241 | (0.89) | 0.0245 | (0.90) |
| **Partner in PHI** | | | | | 1.195*** | (24.33) | 1.194*** | (24.32) |
| Constant | -2.116*** | (-23.70) | -2.116*** | (-23.69) | -3.099*** | (-13.92) | -3.106*** | (-13.93) |
| athrho | | | | | | | | |
| Constant | 1.141 | (0.53) | 1.197** | (2.08) | 1.508*** | (12.01) | -1.431*** | (-10.27) |
| lnsigma | | | | | | | | |
| Constant | -6.044 | (-0.18) | -5.242 | (-0.67) | -2.339** | (-2.37) | -3.025** | (-2.32) |
| AIC | 67424421 | | 67391878 | | 28348648 | | 28290479 | |
| BIC | 67424865 | | 67392391 | | 28349179 | | 28291137 | |
| Observations | 38215 | | 38215 | | 20594 | | 20594 | |

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